DOCUMENT RESUME

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INSTITUTION Sanford - Lee County Schools, N.C.
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DESCRIPTORS *Bricklaying; Building Trades; Individualized Programs; Instructional Aids; Instructional Materials; Learning Activities; Manuals; Secondary Education; *Sequential Programs; Skilled Occupations; *Study Guides; Supplementary Textbooks; *Trade and Industrial Education; *Unit Plan

ABSTRACT

Twenty illustrated booklets, each representing one unit of learning, comprise the student's guide to an individualized course in bricklaying, in the occupational cluster of masonry. The guide was developed for a research project in a North Carolina high school, and is intended for use in conjunction with several textbooks and a series of slide/tape packages. The textbooks and tape script are not included in the document. The booklets range in length from 5 to 45 pages, each providing the unit's title, rationale, objectives, and the unit's task packages. There may be from one to nine task packages in each unit. A task package includes title, prerequisites, a rationale, a specific behavioral objective, learning activities, and learning practice. Learning activities are assignments in the textbooks and audiovisual packages; the student's attention is directed to specific content in an informal and sometimes humorous style. Learning practice is related to those assignments and takes the form of pencil and paper exercises or directions for hands-on experience to be supervised by the instructor at the student's request. All the task packages in a given unit must be completed successfully before the student can progress to another unit; the units are not necessarily sequential. (AJ)

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RESEARCH PROJECT

SANFORD CENTRAL HIGH SCHOOL

1708 NASH STREET

SANFORD, NORTH CAROLINA 27330

CLUSTER: MASONRY

COURSE: BRICKLAYING

CE033931

UNIT I: TOOLS, EQUIPMENT AND MATERIAL FOR MASONRY

PREREQUISITES: NONE

RATIONALE:

The skilled craftsman must be able to select and properly use tools for the job to be completed if he is to perform masonry tasks effectively and skillfully. Your success as a mason will depend in part upon your ability to select, use and care for tools efficiently and safely. You will also become aware of the shapes and sizes of brick and block units as well as equipment for the mixing of mortar and use and care of scaffolds. The successful completion of the task packages in the unit will enable you to perform more complex construction tasks later in the course. Continue by reading the General Objective for the unit and the Specific Objectives for each task package. Proceed to the Learning Activity, which will indicate to you what you are to do and how this unit is to be completed.

OBJECTIVES:

General:

Upon completion of this unit package you will be able to use masonry tools with a degree of skill and confidence.

Specific:

Upon completion of the task packages for this unit, you will be able to:

OBJECTIVES (cont'd):

1. Correctly identify in writing all the names of seven basic tools and three measuring devices. Your performance will be evaluated in accordance with the instructor's checklist.
2. List in writing at least two care and maintenance operations for each of the five basic hand tools and one basic measurement device used in masonry construction. Your performance will be evaluated in accordance with the instructor's checklist.
3. Do the following:
   a. list in writing the names of at least four kinds of standard brick used in masonry construction.
   b. name in writing and calculate the number of at least seven types of modular brick units needed in a given wall.

   Your performance will be evaluated in accordance with the instructor's checklist.
4. Identify in writing, from an illustration, the correct name of concrete and cinder block units used in masonry construction. Your performance will be evaluated in accordance with the instructor's checklist.
5. Use a six-foot folding spacing rule, and to measure course layout to the nearest 1/32" for the folding rule. Your performance will be evaluated in accordance with the instructor's checklist.
6. Use a mason's level to check a vertical wall for plumbness and a flat surface for levelness. The acceptable standard will be

OBJECTIVES (cont'd):

when the bubble settles between the marked lines of the vials on the level.

7. Do the following:

   a. name in writing four types of stationary and two types of adjustable scaffolds used in masonry work.

   b. list two care and maintenance procedures for the scaffolds identified in the above statement.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

In order to complete this unit successfully you should begin your work on Task Package 1. You will notice that the other packages in this unit do [illegible]; therefore they may be done [illegible] these task packages you are asked to view [illegible] answer questions and [illegible]. The titles of the packages contained in the unit are:

TASK PACKAGE 1: [illegible] TOOLS AND MEASURING DEVICES

TASK PACKAGE 2: CARE AND MAINTENANCE OF BASIC HAND TOOLS AND MEASUREMENT DEVICES

TASK PACKAGE 3: IDENTIFYING KINDS AND SIZES OF BRICK

TASK PACKAGE 4: IDENTIFYING CONCRETE AND CINDER BLOCK UNITS

TASK PACKAGE 5: BRICK SPACING RULE AND COURSE LAYOUT

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 6: MASON'S LEVEL

TASK PACKAGE 7: SCAFFOLDS

At this point, should you feel able to pass a comprehensive test on the Tools, Equipment and Materials covered in this unit, contact your instructor. However, should you feel that you are not ready to be tested, begin your work as outlined above.

BM-I-1

UNIT I: BRICKLAYERS' TOOLS AND MEASURING DEVICES

TASK PACKAGE I: BASIC TOOLS AND MEASURING DEVICES

PREREQUISITES: NONE

RATIONALE:

This task package could well be a springboard to a rewarding career in the building construction field. In this first package, the basic tools and measuring devices used by the bricklayer will be identified.

Hand tools of the bricklayer have not changed much in the last 5000 years, other than a change in their shape. These tools are the trowel, brick hammer, brickset, striking iron (jointer), level, and "carpenter's" square. The measuring devices are the brick spacing rule, storypole, and 50 ft. or 100 ft. tape. These tools and measuring devices are used as manipulative, cutting, aligning, and measuring instruments.

Learning to recognize and properly using tools and measuring devices are essential in carrying out the duties of a craftsman. These are instruments he will use on the job daily.

The package has been developed to provide you with Learning Activity and Practice to help you achieve the behavioral objectives.

Now continue by reading the behavioral objective and performing the Learning Activity and Learning Practice. As you go through each

RATIONALE (cont'd):

of your learning activities think of the objectives frequently so that your own goal will always be in sight. Have a good day.

OBJECTIVE:

Upon completion of this task package you will be able to: correctly identify in writing all the names of seven basic tools and three measuring devices used in masonry construction.

LEARNING ACTIVITY:

1. View slide-sound package #BM-I-1 at the resource center.
2. Read Bricklaying Vocational Training, pages 4 through 9 and the section on Story Pole and Gage Stick on page 10.
    a. Notice the appearance and the names of the tools and devices.
    b. Observe figures 2 - 1 through 2 - 5.
        (1) One of these tools is the most important and one is the most delicate.
        (2) Which are they?
    c. Relate the spacing rule to the performance of the story pole? and corner guide.
        (1) Why is the spacing rule needed to make up a story pole?
        (2) How does the corner guide depend on the use of the spacing rule?

LEARNING ACTIVITY (cont'd):

d. View the illustration on page 19 (a) & (b) of figure 4 - 1.

e. Read article (c) of figure 4 - 1, page 19, of Bricklaying Vocational Training to recognize where and why the striking iron is used.

(1) What is the average rule for laying brick to the line?

* The answers to the above questions should be turned in to your instructor.

LEARNING PRACTICE:

1. Visit the tool room and identify the brick trowel, brick hammer, spacing rule, brickset, level, steel square, and striking irons. When you feel that you can identify them all ask the instructor to check your knowledge.
2. From a marked off story pole, supplied by the instructor, be prepared to explain in writing, on a sheet of paper, in outline form, the details of the marks and how they coincide with the parts of a brick wall and the relationship to the windows and doors. Also explain the relationship of the story pole to the spacing rule.
3. Hand in all written answers to your instructor for checking.
4. You've got a lot to learn, so be on your way to the next task package.

UNIT I: CARE AND MAINTENANCE

TASK PACKAGE: CARE AND MAINTENANCE OF BASIC HAND TOOLS AND MEASUREMENT DEVICES

PREREQUISITES: UNIT I, TASK PACKAGE 1

RATIONALE:

The care and maintenance of tools is important to all skilled craftsmen since the condition of their tools will greatly affect the quantity and quality of the work produced. The mason must keep his hand tools in proper working order if he is to perform his job effectively and skillfully. This exercise will enable you to gain essential knowledge about the proper care and maintenance of the various hand tools which you will use in all of your masonry work.

OBJECTIVE:

Upon completion of this task package, you will be able to list in writing at least two care and maintenance operations for each of the five basic hand tools and the one basic measuring device used in masonry construction.

LEARNING ACTIVITY:

1. View the slide-sound package #BM-I-2.
2. Read pages 4 - 9 Bricklaying Vocational Training.
3. Why is it necessary for you to care for tools? State in writing your answer to this and all subsequent questions.
4. What will happen if you allow mortar to harden on a trowel? How might this affect your ability to spread mortar?
5. What is the purpose of rubbing linseed oil on the wooden surface of the level?
6. After you answer these questions, have your instructor check your results.

LEARNING PRACTICE:

From the package of tools supplied by the instructor, examine the following tools and on a separate sheet of paper describe the care and maintenance operations that were not observed.

1. Examine the two mason trowels.
    A. What caused the trowel blade to rust?
    B. What operation was ignored that resulted in mortar build-up on the trowel?
    C. Observe the handle: what misuse of the handle caused this condition?
2. Pick up the brick hammer.
    A. What needs to be done to dress the cutting edge or chisel peen of the hammer.

LEARNING PRACTICE (cont'd):

B. Observe the connection between the handle and head. How can the looseness between the head and handle be corrected? How could this condition be prevented?

3. Select the blocking chisel and examine the cutting edge. What should be done to correct the chipped portion of the cutting edge? What corrective action needs to be taken on the striking end?

4. Now pick up the square and examine its condition. What corrective action needs to be performed? Where should the square be placed when not used in a work area?

5. Pick up the plumb rule and observe its condition. Do you know how much it cost to purchase this tool? List two care and maintenance operations that were ignored?

6. Pick up the six foot folding rule and locate the 8" mark. Whoops! Looks like this rule is missing something. List two possible causes of the breaking of the rule. Do you find it difficult to measure an 8" length with this rule? What corrective action could be taken to loosen the joints of this rule?

7. After you finish this practice hand your answer sheet in to your instructor for evaluation.

A tool is like a friend: if you treat it okay it will repay you many times.

Want a job tomorrow? Advance to the next task package.

UNIT I: KINDS AND SIZES OF BRICK

TASK PACKAGE #3: IDENTIFICATION OF KINDS AND SIZES OF BRICK

PREREQUISITES: NONE

RATIONALE:

In modern masonry, there are many kinds of brick because varying styles of brick are needed to serve different purposes. Some of the brick differ in composition and design. Some are produced for economy, others for strength, and still others for appearance. And, there are brick made for special uses.

Modular brick, with their respective sizes, evolved from standard-size brick. Using modular brick eliminates excessive cutting, and saves time and energy. You will use modular brick when installing windows, door frames, etc. Don't you wish everyone used modular brick? Knowing the types and sizes of modular brick will make you a more efficient and well-paid mason.

OBJECTIVE:

Upon the completion of this task package you will be able to:

a. list in writing the names of at least four kinds of standard brick used in masonry construction.

b. name in writing, and calculate the number of at least seven types of modular brick units needed for a given wall.

LEARNING ACTIVITY:

1. Read: Bricklaying Vocational Training, page 13, section on Size of Brick; page 14, table 3-1, Modular Size of Brick.
2. Read: Masonry Simplified, Volume I, pages 257 through 261, Kinds of Brick.
3. View sound-slide package #BM-I-3.
4. Why was the modular size brick developed when we had a variety of standard brick? What makes the difference between a face brick and a glazed brick?
5. Knowing the kind of brick will not build a wall, such as learning spreading of mortar, but it will aid in the reading of the specifications for the construction of a building.

LEARNING PRACTICE:

1. Identify by name in writing four of the kinds of standard brick used in the construction of a wall from Kinds of Brick in Masonry Simplified, Volume I, pages 257 and 258.
2. (Using Table 3-1, on page 14 of Bricklaying Vocational Training,) determine the unit designations and number of brick needed to fill in the wall opening of the following:
   a. Height 2 2/3", thickness 4", length 36"
      (1.) Unit designation ______________________
      (2.) Number of units ______________________

LEARNING PRACTICE (cont'd):

b. Height 3 1/5", thickness 4", length 48"

(1.) Unit designation ______________________

(2.) Number of units ______________________

c. Height 2", thickness 4", length 36"

(1.) Unit designation ______________________

(2.) Number of units ______________________

d. Height 2 2/3", thickness 6", length 60"

(1.) Unit designation ______________________

(2.) Number of units ______________________

e. Height 4", thickness 4", length 36"

(1.) Unit designation ______________________

(2.) Number of units ______________________

f. Height 2 2/3", thickness 4", length 32"

(1.) Unit designation ______________________

(2.) Number of units ______________________

g. Height 4", thickness 4", length 40"

(1.) Unit designation ______________________

(2.) Number of units ______________________

3. Let your instructor check your answers for this exercise and the following one on your downtown tour when it is completed.

4. Take a tour of the downtown area and locate buildings which are constructed of different types of brick. Write the name and

LEARNING PRACTICE (cont'd):

location of building and the kind of brick used on a sheet of paper and hand in to the instructor. List at least five buildings.

Did you know that Sanford is the brick capital of the United States? Don't you feel kind of proud?

BM-I-4

UNIT I: CONCRETE AND CINDER BLOCK UNITS

TASK PACKAGE: IDENTIFYING CONCRETE AND CINDER BLOCK UNITS

PREREQUISITES: NONE

RATIONALE:

There are many shapes and sizes of concrete and cinder blocks used in masonry constructions. It is necessary to recognize these various shapes and sizes because architects and builders specify the different varieties in design specifications for construction. In this task package you will be introduced to the varying styles of concrete and cinder block units. You will become familiar with such names as bull-nosed, partitioned, stretched, channel, and trough. Don't get these names mixed up, for you might wind up with a "hog in the wall".

OBJECTIVE:

Upon completion of this task package you will be able to identify, in writing, from an illustration, the correct name of concrete and cinder block units used in masonry construction.

LEARNING ACTIVITY:

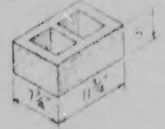
1. Read Masonry Simplified, Volume I, pages 143 through 146, Shapes and Sizes of Concrete Masonry Units.
2. View sound slide package # BM-I-4.
3. Observe the different shapes of concrete and cinder blocks in the school buildings. Compare your results with those of your classmates.
4. What is the actual size of a stretcher block? Write your answer to this and all subsequent questions for submission to your instructor for evaluation
5. Can you distinguish between a concrete and cinder block? If not, you had better check with your instructor. How is this difference observable?
6. From illustrations in the Learning Practice, select the correct shape and size to correspond with the samples of concrete or cinder block provided by your instructor.

LEARNING PRACTICE:

Under each illustration on pages 4 and 5 of this task package, write the name of the type of block unit. After having completed the exercise, check your answers in the reading assignment against those in the book. Don't feel bad if you missed some; this is to be expected. However, if you missed more than 12, go back and repeat the reading assignment.

Don't be bull nosed about it; bend a little, complete this package, and go on to another.

SHAPES AND SIZES OF BLOCK UNITS



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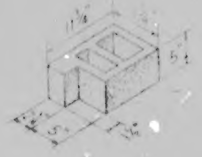

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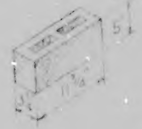

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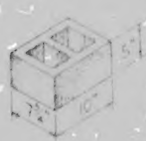

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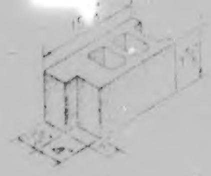

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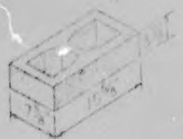

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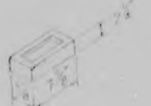

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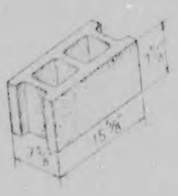
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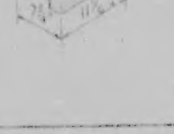

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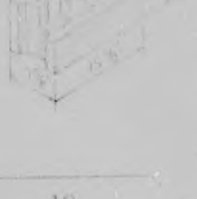

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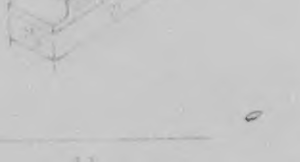

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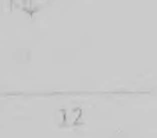

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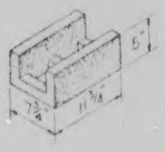
Figure 1

SHAPES AND SIZES OF BLOCK UNITS



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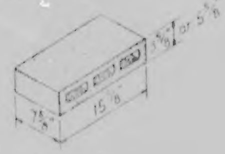
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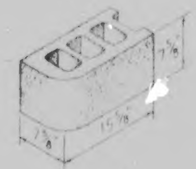
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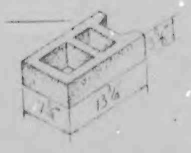

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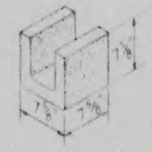

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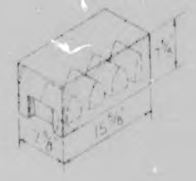

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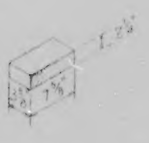

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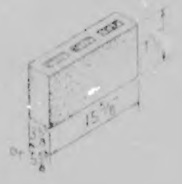

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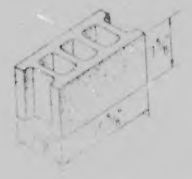

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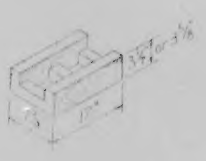

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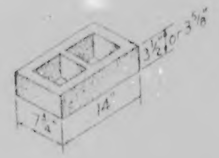

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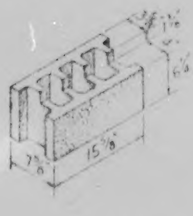

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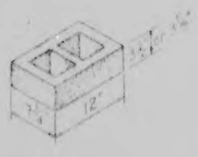

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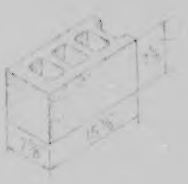

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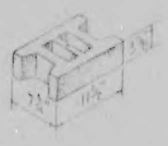

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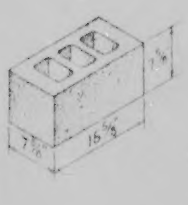
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Figure 2

BM-I-5

UNIT I: TOOLS, EQUIPMENT AND MATERIALS FOR MASONRY

TASK PACKAGE 5: BRICK SPACING RULE AND COURSE LAYOUT

PREREQUISITES: NONE

RATIONALE:

Unfold your spacing rule and lay out the course. That's what you need to do in this package. Now, pace yourself, use your six-footer and really lay it out accurately.

A skilled craftsman must be able to use appropriate tools for the job to be constructed if he is to perform masonry tasks effectively. The student's mastery of the Objective in this task package is essential to his success in completing the Objective in later task packages. You will gain the ability to use various types of measuring tools to perform all required measurement tasks in completing your subsequent task packages. This package contains the information on how to read and measure course layout using a brick mason's six-foot standard spacing rule. Continue, now, by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to read a six-foot standard brick-spacing rule, and measure course layout to the nearest 1/32".

LEARNING ACTIVITY:

1. View sound-slide package BM-I-5, a super attraction.
2. Read and study Bricklaying Vocational Training, page 7, section Six-Foot Rule. Observe that the spacing rule is used in laying out a story pole and laying out arches over windows.
3. View figure 1 in this task package. Observe the two faces of the rule; the one side being the 6-foot folding rule (used extensively as a measurement tool) and the other side being the brick mason's spacing rule (used to determine the course spacing for the brick and mortar joints inclusively).
4. There is very little written information found on this spacing rule. So follow very carefully the explanation of the rule in the Learning Practice.
5. This completes the Learning Activity; begin now on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Six-foot standard brick-spacing rule

1. Acquire a 6-foot standard brick-spacing rule from the instructor.
2. Observe the two sides of the rule; one side is the conventional side of the rule and the other side is the standard brick-spacing rule.
3. The spacing face of the standard brick-spacing rule is laid out in divisions represented by the figures one through ten. These figures indicate the height of a brick and mortar joint for a given brick.
4. When given a wall height of 48 and 3/8 inches, read the conventional side of the rule, t[illegible] the rule over and number five on the spacing rule is the indicator of the brick course spacing to be used. This means with a standard brick (2 1/4 inches in height) the thickness of the mortar joint is 7/16 of an inch. If the wall height had been 47 and 1/4 inches, the brick spacing would be a number 4, and with a standard brick the mortar joint thickness is 3/8 of an inch.
5. It is possible to use any one of five course numbers for a given brick; therefore the wall height, door height and window height are the indicators as to which course spacing is selected. Example: The height of a finished masonry opening for a door is

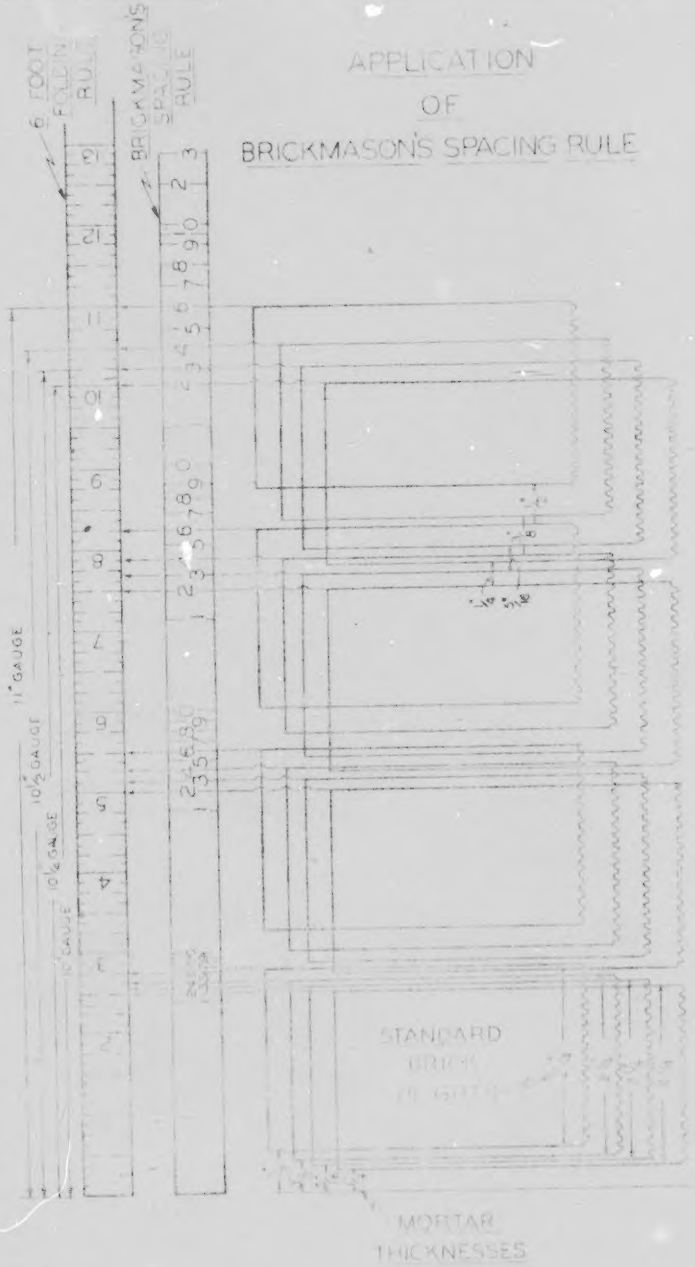
LEARNING PRACTICE (cont'd):

6 feet 11 inches from the floor. What is the course spacing to be used? Answer: number five.

6. Using the 6-foot standard brick-spacing rule, indicate in writing the course members to coincide with the following:
   a. Wall height 31 1/2"; course number is __________.
   b. Wall height 44"; course number is __________.
   c. Wall height 51 1/16"; course number is __________.
   d. Wall height is 38 7/16"; course number is __________.
   e. Window opening height is 7' 1 3/16"; course number is __________.
   f. Door opening height is 7'; course number is __________.

Now that you're all coursed out, take your answers and discuss them with your instructor. It is necessary to master the spacing rule, for you will be using it extensively in constructing many of your masonry walls. Brick masonry is your thing - do it.

Success is a play. Keep rehearsing.



APPLICATION OF BRICKMASON'S SPACING RULE

6 FOOT FOLDING RULE
BRICKMASON'S SPACING RULE
11" GAUGE
10½" GAUGE
10¼" GAUGE
10" GAUGE
STANDARD BRICK HEIGHTS
MORTAR THICKNESSES

The spacing rule is similar in construction to any other six-foot rule and should be cared for in a similar manner. The joints should be oiled and the surface of the rule should be kept clean. Also, care should be taken to prevent an excess of rubbing on the surface of the rule since this will wear the figures.

Figure 1

UNIT I: TOOLS, EQUIPMENT AND MATERIALS FOR MASONRY

TASK PACKAGE 6: MASON'S LEVEL

PREREQUISITES: NONE

RATIONALE:

Do you like prized tools? Well, the mason's level is one of the best. So pause now and get acquainted with this prize.

In order to perform the various tasks that are required of brick masons on the job site, it is necessary to develop basic skills in the proper use of different hand tools. One such tool is the mason's level, the most delicate and most likely the most prized tool owned by the brick mason. In this task package you will use this device to determine whether or not a surface is plumb or level. Anxious to get going? Okay, then read the Objective and do the Learning Activity and Learning Practice as often as necessary, for it sets forth your goals for this task package. Bug out and get ready to level with this assignment.

OBJECTIVE:

Upon completion of this task package you will be able to use a mason's level to check a vertical wall for plumbness and a flat surface for levelness. The acceptable standard will be when the bubble settles between the marked lines on the vials of the level.

LEARNING ACTIVITY:

1. View sound-slide package BM-I-6, starring James Mason's Level.
2. Read page 8 in Bricklaying Vocational Training, concerning the level; refer to figure 2-5, the picture of the level. Observe the safety tips and learn to use them, for this will insure you of a long-lasting and valuable tool.
3. See figure 1 in this task package; observe the position of the bubbles in the vials of the levels.
4. This completes the Learning Activity. Proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Mason's level

1. Secure a level from the tool crib, with the instructor's permission, and perform the following jobs.
2. Place the narrow edge of the level against the side jamb of the

LEARNING PRACTICE (cont'd):

entrance doorway to the masonry laboratory. The level should be held in a vertical position, as shown in figure 1 of this task package. Check the position of the bubble that is visible and runs in a horizontal direction. Has the bubble settled between the marked lines? If so, the side jamb is said to be plumb; if not, it is out of plumb.

3. If the jamb is out of plumb, step 2 above, alternately move each end of the level slightly away from the jamb, but keep the opposite end tight to the jamb. Observe the bubble closely. When the bubble settles between the lines, the jamb is plumb. Record on paper the fractional part of an inch that the jamb is out of the plumb.

4. Check the other side jamb of this doorway, following the procedure outlined in steps 2 and 3 of the Learning Practice. Record your answer as before.

5. With the level held against the top jamb (head) of the doorway similar to the horizontal position on the level in figure 1 of this task package, read the bubble that is visible in the long tube. If the bubble settles between the lines of the top jamb, it is said to be level. Compare to level bubble in figure 1 in this task package. If it is not level, move each end in succession (as you did on the side jamb) until the bubble is centered between

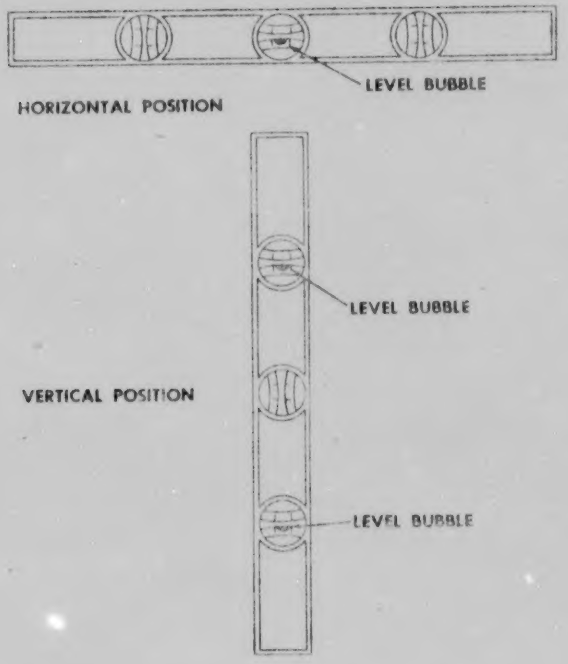
LEARNING PRACTICE (cont'd):

the lines. Record the approximate distance, if any, that the top jamb is out of level.

6. Allow your instructor to check your answers. If you did not complete the Learning Practice successfully, you are requested to repeat it until it meets the instructor's checklist.

7. So you completed it correctly; super! Move on to task package 7.

Oh, by the way, did you know that "Happiness is a job well done." Keep leveling with masonry skills, and rise to higher levels.


LEVEL BUBBLE
HORIZONTAL POSITION
LEVEL BUBBLE
VERTICAL POSITION
LEVEL BUBBLE

MASON LEVEL

Figure 1

BM-I-7

UNIT I: TOOLS, EQUIPMENT AND MATERIALS FOR MASONRY

TASK PACKAGE 7: SCAFFOLDS

PREREQUISITES: NONE

RATIONALE:

How would you like to be a real swinger? Well, becoming a brick mason, you will some day have an opportunity to work from a swinging stage scaffold. Most of the masonry walls the bricklayer constructs are over five feet in height; therefore it is necessary to have a temporary platform built for the support of workman and material. This temporary platform is known as a scaffold. In this task package you will become knowledgeable about different stationary and adjustable scaffolds. Working from a scaffold is many times easier than working from uneven ground at the early stage of building a wall. You should acquire considerable respect and appreciation for using the scaffolds. Continue, now, by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to:

a. name in writing four types of stationary and two types of adjustable scaffolds used in masonry work.

b. list two care and maintenance procedures for each scaffold identified in the above statement.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-I-7, starring Scaffold the Swinger.
2. Read Bricklaying Vocational Training, page 11, and note figure 2-9 on page 12.
3. Read and study the information of pages 5 and 6 of this task package.
4. View figures 1 through 4 in this task package. Looks scary? Well, it isn't as bad as climbing the steel girders on a large skyscraper.
5. So now that you have both feet on the ground (scaffold), continue on with the Learning Practice.

LEARNING PRACTICE:

1. A scaffold is a temporary platform built for the support of

   __________ and __________.

2. Be very careful in building __________ because workmen's lives depend upon safety.

3. A foot scaffold is a type of scaffold that should not exceed __________ inches in height.

4. When construction of masonry is worked from the inside, a __________ __________ scaffold is used made of wooden parts.

5. Another of the wooden scaffolds built from the ground upward to the desired height on the outside of a building is called a __________ scaffold.

6. A __________ scaffold is used extensively when working from the deck inside the walls when composite walls are constructed.

7. The adjustable type scaffolds shown in Bricklaying Vocational Training are the __________ stage and __________ type.

8. Exercise great care in building scaffolds because workmen's lives depend upon safe equipment. No __________ is temporarily nailed for it may be forgotten and never adequately __________.

9. In erecting a putlog scaffold the uprights must be __________ to the wall by stays. These stays may be passed through a wall opening and fastened to a structure inside.

LEARNING PRACTICE (cont'd):

10. If there are any questions, check with your instructor.

11. So, you've gone to higher heights on a swinging scaffold, not quite as high as swinging on a star. Very good. See your instructor for evaluation of your work.

12. Upon satisfactory completion of the Learning Practice, turn your attention to the next task package. In the work projects to be done, it is very possible to have violations of safety rules. So look at the accompanying illustration and pick out many violations you can avoid.

The poet Robert Frost was a swinger of birches, but you're becoming a swinger of scaffolds.

BASIC CONSIDERATIONS

A scaffold is a temporary platform built for the support of workmen and materials. Scaffolds are necessary after the bricklayer has completed work at the height he can reach by standing on the floor or ground. Extreme care is taken in building scaffolds because workmen's lives depend upon them. No scaffolding is temporarily nailed for it may be forgotten and never adequately nailed. When the scaffold planks at one level are no longer needed, they should be removed; falling mortar will hit them and splash on the wall. Rough lumber should be used for wood scaffolding.

TYPES OF SCAFFOLDING

Several types of scaffolds are described below:

a. Trestle Scaffold. When construction is such that the brick can be laid from the inside of the wall, a trestle scaffold as shown in figure 173 may be used. The trestles should be from 4 feet to 4 feet 6 inches high. The scaffold planks rest on the trestles and should be 2 by 10's. After the wall has been built to a height of 4 or 5 feet, the trestle scaffold should be erected. The wall can then be completed to the next floor level while the bricklayer works from the scaffold. As soon as the rough flooring for the next floor is in place, the above procedure is repeated. The trestle should remain at least 3 inches from the wall in order to make sure it will not push against the newly laid brick and force them out of line.

b. Foot Scaffold. At times it may be necessary to reach higher than the trestle scaffold permits. Then a foot scaffold such as the one shown in figure 174 can be used. The 2 by 10 planks rest on bricks which can be supported by the trestle scaffold. This type of scaffold should not exceed 18 inches in height.

c. Putlog Scaffold.

(1) When it is necessary to erect the scaffold from the ground to the height required, a putlog scaffold can be used to advantage. The uprights should be 4 by 4's supported on a 2 by 12 inch plank 12 inches long for bearing on the soil. These upright should be spaced on 8-foot centers. There should be 4 feet 6 inches between the wall and the uprights. The ledgers should be made from 1-by 8-inch lumber nailed to the uprights, as shown in figure 175. The putlog is a 3 - by 4 - inch piece of lumber that rests on top of the ledger and against the upright. The other end of the 3 by 4 rests on the wall; a brick is omitted to provide an opening for it. The putlog is not fastened to the ledger. On top of the putlog, five 2 by 12's are placed to form the scaffold platform. The planks are not nailed to the putlog.

(2) The uprights must be tied to the wall by stays. These stays may be passed through a window opening and fastened to the structure inside the building or spring stays may be used as shown in figure 175. Spring stays are made by placing two 2 - by 6 - inch boards in an opening in the wall formed by omitting a brick. After the boards are inserted into the hole, a brick is placed between them and forced to a position close to the wall. The boards are then sprung together and securely nailed to the ledger.

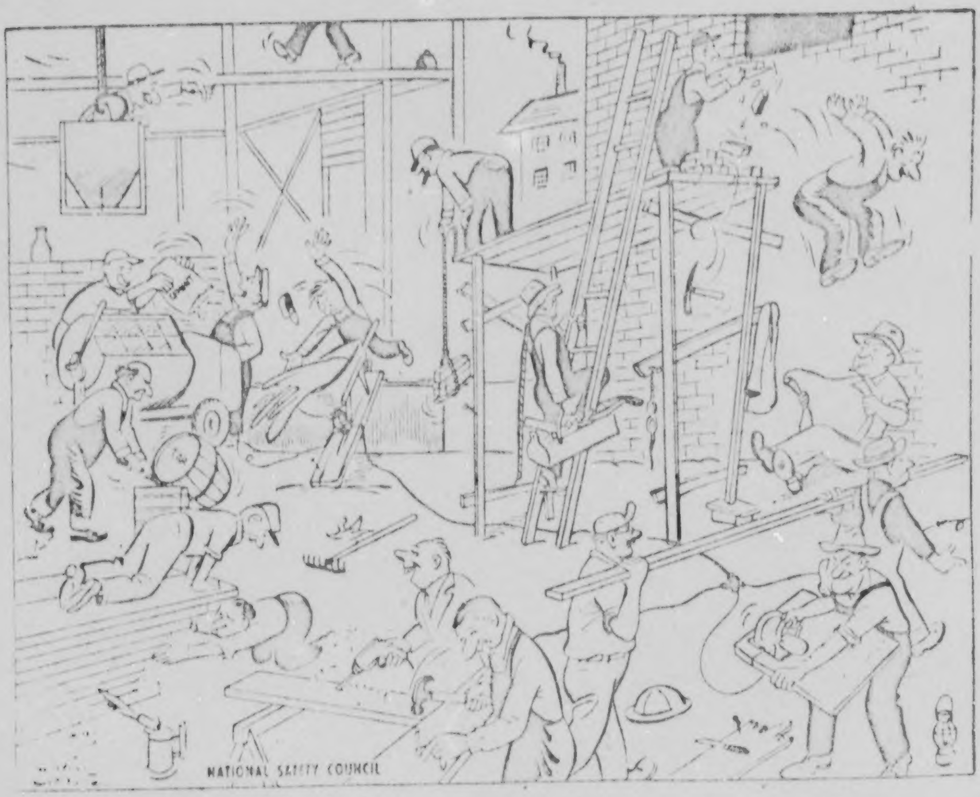
(3) The putlog may also be used as a stay in which case a wooden wedge should be driven above the putlog and into its hole in the wall. The wedge should then be nailed to the putlog and the putlog be nailed to the ledger. Longitudinal cross bracing must be installed as shown in figure 175.

d. Outrigger Scaffold. This scaffold consists of 2 - by 10 - inch planks supported on a wooden beam projecting from the building. The beam is supported as shown in figure 176. If a steel outrigger beam is used, the beam is fastened to the form work of the structure by means of threaded U-shaped bolts.

e. Steel Scaffolding. When prefabricated steel scaffolding such as that shown in figure 177 is available, it should be used. It is more easily erected and dismantled and can be reused many times.

UNSAFE PRACTICES

Can you find twenty unsafe practices? If not, you do not know your safety regulations.


NATIONAL SAFETY COUNCIL

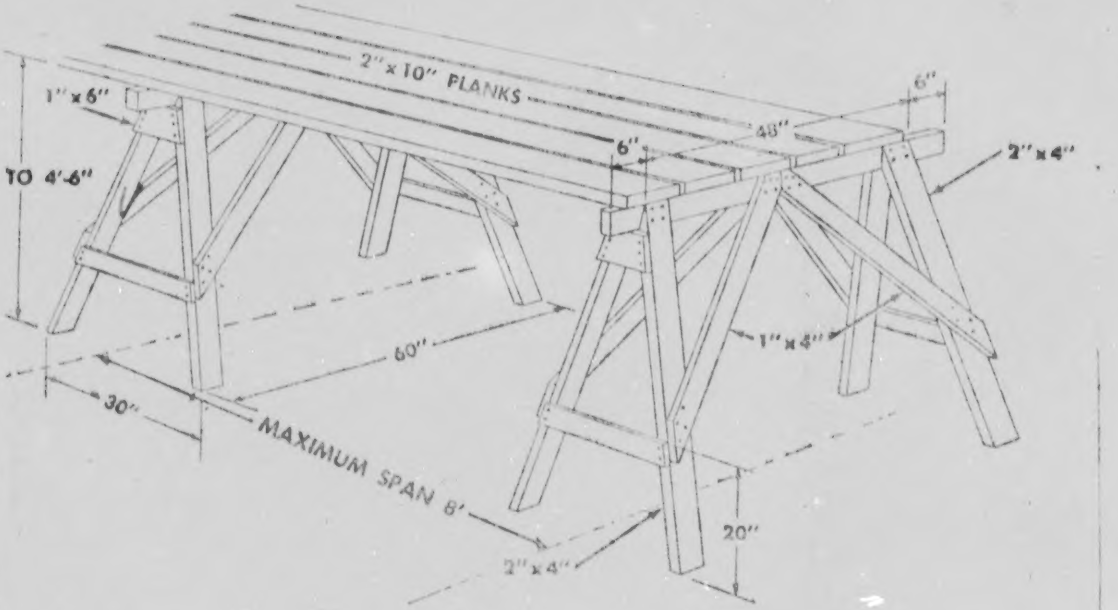

2" x 10" PLANKS
1" x 6"
TO 4'-6"
6"
48"
6"
2" x 4"
1" x 4"
60"
30"
MAXIMUM SPAN 8'
20"
2" x 4"

Figure 173. Trestle scaffold.

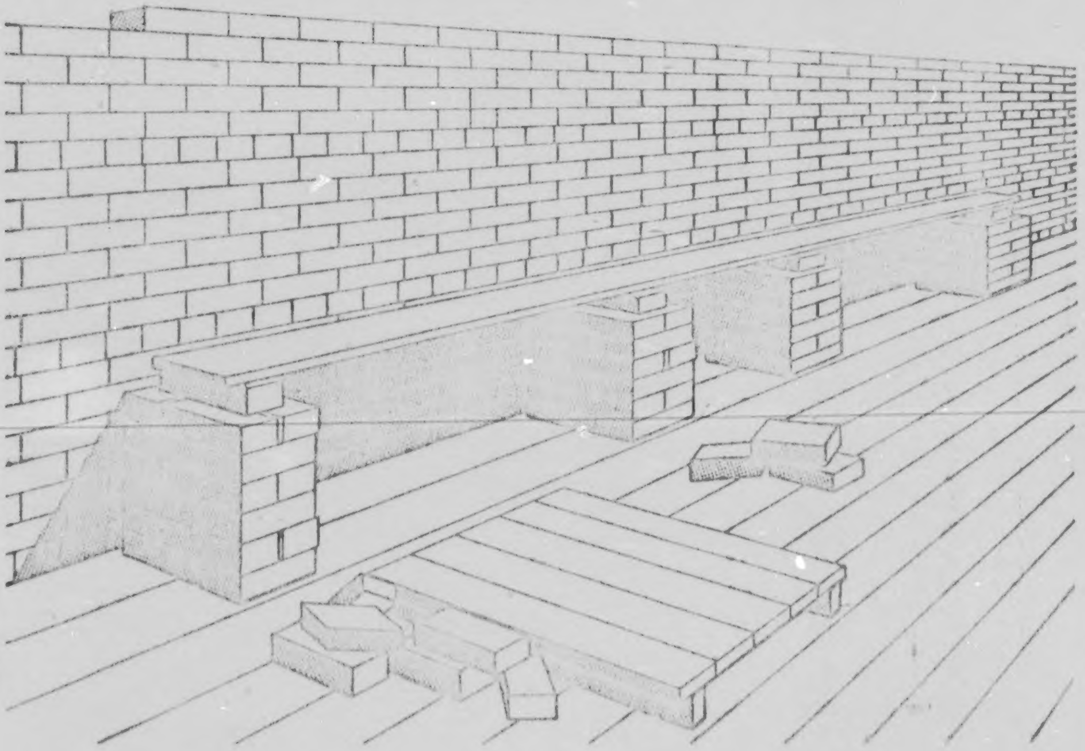
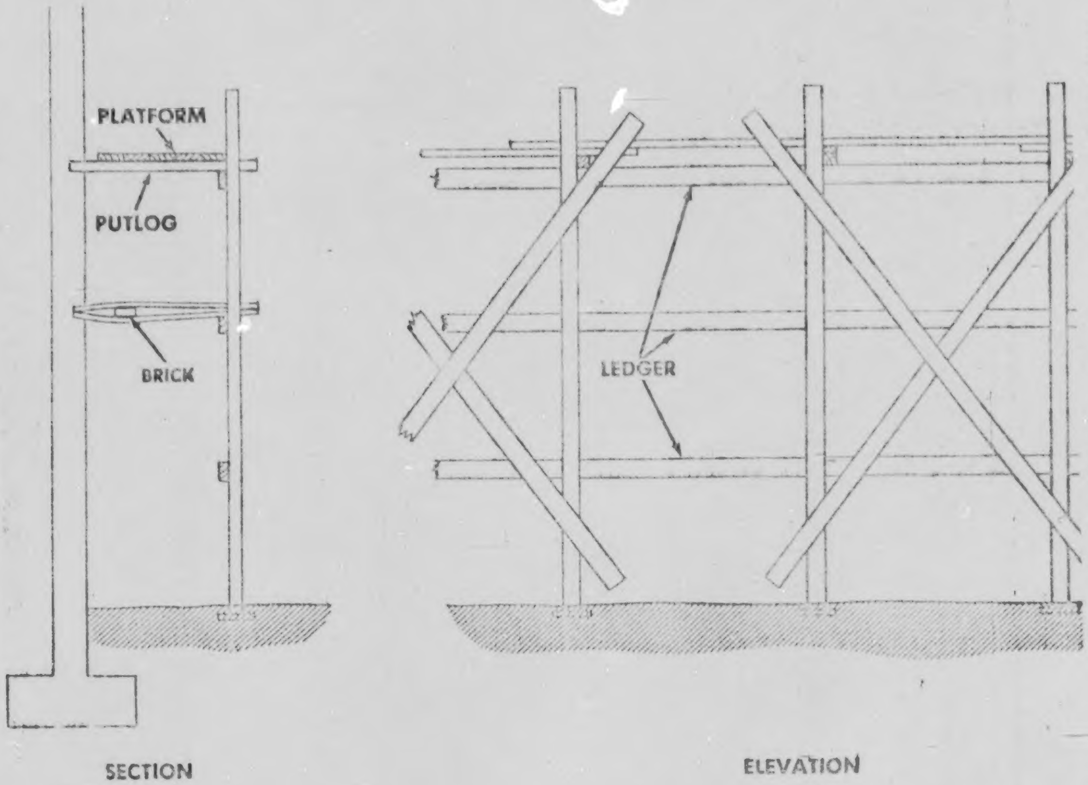


Figure 174. Foot scaffold.

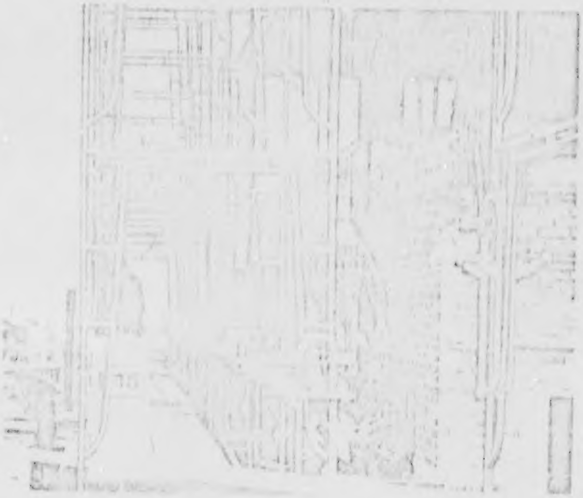
Figure 1


PLATFORM
PUTLOG
BRICK
LEDGER
SECTION
ELEVATION

SINGLE-POST SCAFFOLD

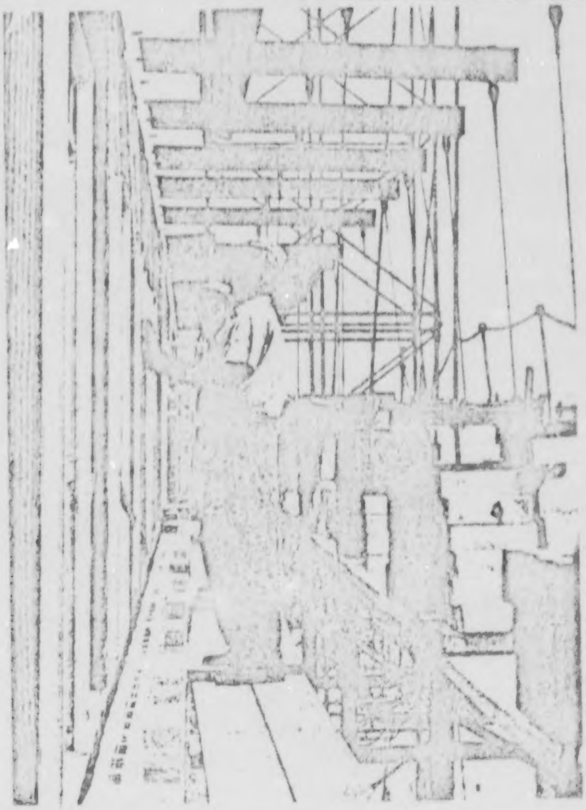
Figure 175. Putlog scaffold.

Figure 2

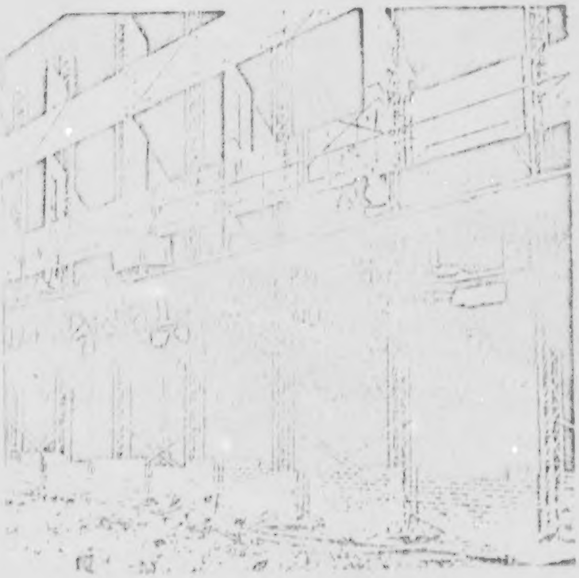


Tubular Scaffold with Adjustable Brackets

Tower Scaffold.



Swing Stage with Dropped Platform



Tower Type Adjustable Scaffolding

Figure [illegible]

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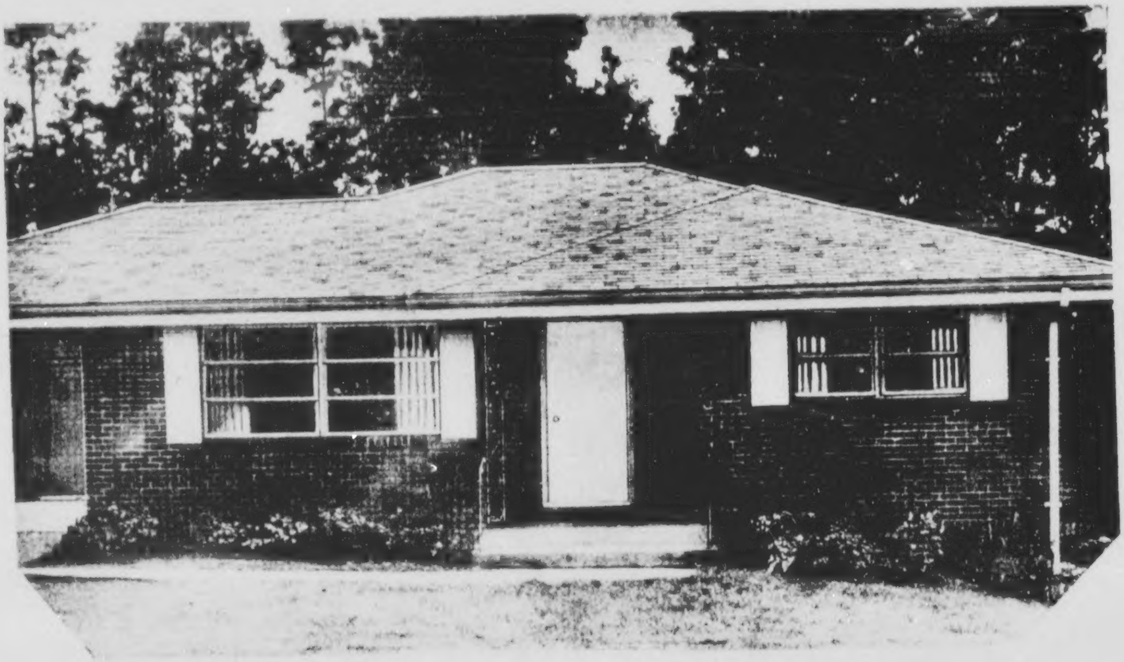

CLUSTER: MASONRY
COURSE: BRICKLAYING

UNIT PACKAGE II: BASIC TOOLS, EQUIPMENT AND MATERIALS NEEDED FOR MIXING MORTAR

PREREQUISITES: NONE

RATIONALE:

Mixing mortar is one of the many operations that are important in masonry construction. While the mason seldom does the mixing, it may be necessary for him to supervise the work in case he has an inexperienced mortar man. The tools and equipment required for mixing a batch of mortar are simple, and only a few pieces of equipment and tools are involved.

In order to mix a batch of mortar, it is necessary to learn of the materials, and the proportionate amounts of the different materials, to have a specified type of mortar that will meet job conditions.

Continue by reading the General Objective for the unit and the Specific Objectives for each task package.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to understand the types of mortar materials, tools and equipment necessary to mix a batch of mortar.

OBJECTIVE (cont'd):

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Do the following:
    a. name in writing the five basic hand tools and equipment needed for mixing mortar by hand.
    b. list the three procedures for mixing mortar by hand.
    c. list the four procedures for mixing mortar using the mechanical method.

    Your performance will be evaluated in accordance with the instructor's checklist.

2. Mix a batch of mortar. Materials will be supplied by the instructor. Your performance will be evaluated in accordance with the instructor's checklist.

3. Do the following:
    a. list in writing, five types of masonry work using S type of mortar.
    b. list in writing, five types of masonry work using N type of mortar.

    Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

To complete this unit successfully, you should begin work on task package 1, and then, in order, complete packages 2 and 3. Observe that the task packages do not have a Prerequisite; therefore, they may be done out of numerical order. In the packages you will be asked to view a sound-slide program, read assignments, answer questions, and perform some practical exercises.

The titles of the task packages within this unit are:

TASK PACKAGE 1. BASIC TOOLS AND EQUIPMENT

TASK PACKAGE 2. MIXING MORTAR

TASK PACKAGE 3. TYPES OF MORTAR

If you feel that you can pass a comprehensive test on the material covered in this unit, contact your instructor. However, should you feel that you are not ready to be tested, begin your work as outlined above.

BM-II-1

UNIT II: BASIC TOOLS, EQUIPMENT AND MATERIALS NEEDED FOR MIXING MORTAR

TASK PACKAGE 1: BASIC TOOLS AND EQUIPMENT

PREREQUISITES: NONE

RATIONALE:

Well done on Unit I - and welcome to Unit II. In your basic study of masonry, you must become familiar with the basic tools and equipment. Here's a good place to begin.

Mixing mortar is an important operation in masonry construction. In this task package you will learn of five of the basic tools and how mortar is mixed by hand and mechanical methods. Mixing requires very few tools, but it is necessary that you become familiar with those that are needed. In mixing mortar, using either hand or mechanical methods, one of the more important properties is consistency. Consistency generally refers to the condition of mortar in relationship to the amount of water used in the mix. Because of the nature of the materials and the proportions in which they are mixed, some mortars require more water for the same consistency than others. Usually the mortar material is mixed with the greatest amount of water necessary to make it a workable and trowelable mix. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to:

a. name in writing the five basic hand tools and equipment needed for mixing mortar by hand.

b. list the three procedures for mixing mortar by hand.

c. list the four procedures for mixing mortar using the mechanical method.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-II-1, starring Count Basic Tool.
2. Read page 6 of Bricklaying I, by Delmar.
3. Read pages 35 and 36 of Masonry Simplified, Volume I.
4. Read page 15 of Bricklaying Vocational Training, the section Mixing Mortar.
5. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

1. Having viewed the sound-slide package, visit the tool crib and identify the mortar box, hoe, shovel, wheelbarrow, and steel drum. When you feel you can identify them all, ask the instructor to check your knowledge.
2. Obtain paper and describe in writing how and why the hoe is used.
3. What type shovel is recommended to be used for mortar?
4. What are the two purposes of the steel drum?
5. Describe in writing the method used in Bricklaying Vocational Training textbook for mixing mortar by hand.
6. List the four steps used in mixing mortar for the mechanical method as related on pages 35 and 36 of Masonry Simplified, Volume I.

Could this be magic!

Tools, equipment and know-how add up to success.

UNIT II: BASIC EQUIPMENT AND MATERIALS NEEDED FOR MIXING MORTAR

TASK PACKAGE 2: MIXING MORTAR

PREREQUISITES: NONE

RATIONALE:

Although this package has to do with mixing, don't get mixed up with it. Just learn to mix the mortar properly, and you'll mix fun with profit.

The present-day technique of bonding masonry units with mortar originated with the ancient Egyptians. Chemical examination shows that the Egyptians never used lime until the Roman period and that the cementing material was obtained by burning gypsum. Limestone was more abundant but required a greater temperature and the scarcity of fuel was the reason for using the gypsum. The Romans are given the credit for the wide use of lime mortars. The mortar was prepared then as it is today, by slaking the lime (done commercially today) and mixing with sand and water. The examples of Roman brickwork which still exist are evidence of the perfection which the art attained in ancient times. So as the Romans did, get with the Objective, Learning Activity, and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to mix a batch of mortar. Materials will be supplied by the instructor. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-II-2, featuring Tom Mix.
2. There isn't any reading avalible, so it is necessary to follow the directions given in the Learning Practice.
3. Proceed with the Learning Practice.

LEARNING PRACTICE :

Tools and Equipment

1. Mortar box
2. Mortar hoe
3. Wheelbarrow
4. Shovel
5. Metal bucket
6. Steel drum with water
7. Sand
8. Lime

1. Secure the necessary hand tools from the tool crib.
2. Using the shovel, place 17 to 19 shovels of sand from the outside sand pile into the wheelbarrow, transferring the sand to the mortar box.

LEARNING PRACTICE (cont'd):

NOTE - The general rule for lime mortar proportions is:

2-2 1/4 parts of sand to 1 part of mortar.

3. Add one sack of masonry lime to the sand. Be careful emptying the contents of the bag so that it does not create a dust storm.
4. With the mortar hoe, dry mix the sand and lime together; using a chopping motion with the hoe, mix thoroughly.
5. The water is the next ingredient to be added to the mixture. It will take between 8 and 9 gallons of water. Do not place all the water in at one time but add small quantities and mix it in with the powdered materials. Continue to use a chopping motion with the mortar hoe.
6. Add only enough water to the lime and sand to produce a trowelable, workable mix.
7. All mortar mixing tools should be kept clean at all times to prevent the mortar from hardening on the tools.
8. Now that you mixed a batch of mortar, have the instructor evaluate it for consistency, workability and plasticity.

Can't wait to get your hands on a trowel now? Just around the next corner.

You're mixing it up just right for new masonry skills.

UNIT II: BASIC TOOLS, EQUIPMENT AND MATERIALS FOR MIXING MORTAR

TASK PACKAGE 3: TYPES OF MORTAR

PREREQUISITES: NONE

RATIONALE:

There are all kinds of bonds - family bonds, friendship bonds, hometown bonds, etc. Bonds serve to hold things together. In masonry, the bond that holds the units together is mortar. Learn about it here.

The strength of a brick wall is only as good as the strength of the mortar used in the wall. Some means of bonding masonry units together must be provided, and to meet this requirement we use mortar. When properly mixed and used for its specific purpose, mortar tends to bond masonry units into a solid mass and also acts to retain weather and moisture from penetrating the structure. The mortar most commonly used for masonry construction consists of Portland cement - lime mortars or masonry-cement mortars. The type of masonry work will determine the type of mortar with the correct proportion of mixture. The Portland cement gives strength to the mortar, allowing it to set and harden rapidly. The lime gives plastic qualities to the mortar and aids in making it more workable. Lime also helps the mortar to retain water until the mixture has set. Sand adds bulk and volume to the mortar and prevents a great amount of mortar shrinkage. Continue by reading the Objective, doing the Learning Activity and completing the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to:

a. list in writing five types of masonry work using S type of mortar.

b. list in writing five types of masonry work using N type of mortar.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-II-3, starring Mortar Bond, James's uncle.
2. Read pages 14 and 15 of Bricklaying Vocational Training. Observe table 3-2, page 14, and table 3-3, page 15.
3. Discuss with another student how table 3-2 corresponds with table 3-3.
4. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

1. Report to your instructor and discuss the different types of masonry work in table 3-3 to the types of mortar and the materials for each type in table 3-2 of Bricklaying Vocational Training.

LEARNING PRACTICE (cont'd):

2. In type N Portland cement lime mortar, what proportion of lime is used with the sand and Portland cement?
3. In type S Masonry cement mortars, what proportion of sand is used with the Portland cement and masonry cement?
4. From the table 3-3 on page 15, list five of the types of masonry work that use S type mortar.
5. From the table 3-3 on page 15, list five of the types of masonry work that use N type mortar.
6. After having your work evaluated as satisfactory, you will be directed to the next task package.
7. This task package was meant to give you high strength for what is to come later. You are ready.

As you study these masonry skills, bond them together into unified knowledge.

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CLUSTER: MASONRY
COURSE: BRICKLAYING

UNIT III: SPREADING MORTAR

PREREQUISITES: UNIT I, TASK PACKAGE 2

RATIONALE:

In the art of spreading mortar, the training is much like the training the athlete must go through to become a top performer. It is necessary to develop manipulative skills, using the coordinating members of the body, just as in baseball, basketball, tennis and other sports. In spreading mortar the correct body position to the wall on which the mortar is spread, the correct handling of the trowel, the cupping and spreading of the mortar, and development of the eye skill must be achieved in order to be that top performer.

Continue now by reading the General Objective for the unit and Specific Objectives for the task packages within the unit. Proceed by reading the Learning Activity which explains what you are to do in this unit and how you are to proceed in performing the tasks.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to spread mortar onto a wall, using the manipulative skill required.

OBJECTIVE (cont'd):

SPECIFIC:

Upon completion of the task package for this unit you will be able to:

1. Do the following:
   a. set up a station for spreading mortar.
   b. position yourself to the work station.
   c. spread mortar on a training board.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on spreading mortar consists of only one task package, and it is designed to give you the body positions, handling of the trowel, and the technique of spreading mortar onto a wall.

The title of the task package contained in this unit is:

TASK PACKAGE 1: TECHNIQUE OF SPREADING MORTAR

Note: Unit 1, task package 2 should be completed before beginning this unit. As you do the required work on this task package, you will perform readings, answer questions, and complete other activities as directed. If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT III: SPREADING MORTAR

TASK PACKAGE #1: TECHNIQUES OF SPREADING MORTAR

PREREQUISITES: NONE

RATIONALE:

In this task package you will develop a manipulative skill basic to satisfactory work in the field of masonry - the spreading of mortar. Spreading mortar efficiently requires you to develop methods that will enable you to work with a minimum amount of effort and motion. You will learn how to set up a work station, take the proper stance, and spread the mortar skillfully. Skill in performing these tasks will be a necessary and valuable asset to you in masonry work. Now continue by reading the Objective, then the Learning Activity and the Learning Practice. If you enjoy the outdoors and working with your hands, masonry may really be your bag.

OBJECTIVE:

Upon completion of this task package you will be able to:

1. Set up a work station for spreading mortar.
2. Position yourself to the work station.
3. Spread mortar on a training board.

You will be evaluated using the instructor's check list.

LEARNING ACTIVITY:

Read Bricklaying Vocational Training, page 5, sections 2 through 7; page 6, sections 8 and 9.

1. After you complete the reading, list the basic steps of spreading mortar.
2. Why is it necessary to use the fewest possible motions when spreading mortar?
3. When you have finished your written work show it to your instructor for his approval.

Before going on with the Learning Practice, observe the instructor demonstrate the correct manner of using the trowel for spreading mortar. Try to remember the way your instructor worked as you go through the practice exercises.

4. View the slide-sound program # BM-III-1.

LEARNING PRACTICE:

This Learning Practice is designed to enable you to spread mortar on a work area resembling a wall. To accomplish this, we will use a 2" x 4" board as our wall. It doesn't look much like a wall but you will be surprised at how this practice will help you to handle a real wall.

Set Up

1. Secure 6 concrete blocks, and build two stacks three blocks high approximately two feet apart.
2. Place a 2" x 4" x 42" across the top of both stacks.
3. Set up mortar board or pan 16" to 24" off the floor, using blocks or stand, approximately two feet from the 2" x 4".
4. Now that your work area is set up you are ready to learn the proper stance of spreading mortar. Remember, this is very important to your efficient work.

Proper Stance

You can't hit the ball (spread mortar) if you don't stand in the proper position to the plate (wall).

1. Position your body so that your left hip is parallel with your work surface (2" x 4"). This is the way you spread mortar from right to left.
2. In spreading mortar from left to right, position your

LEARNING PRACTICE (cont'd):

right [illegible] parallel with your work surfaces.

3. How does it feel? Choose the position that suits you the best.

Spreading Mortar

Now you're ready to get with it and spread mortar. Remember that if you don't follow the above steps you will get tired and wonder why.

Tools & Equipment

1. Trowel
2. Mortar
3. 2" x 4" x 42"
4. 6 cement blocks
5. Mortar mix

1. After wetting down your mortar board, place a bucket of mortar onto the board. Looks almost good enough to eat. Don't! The lime in the mortar is caustic; keep it out of your mouth and your eyes.
2. Grasp the handle of the trowel between the thumb and first finger with the thumb resting on top of the handle. See Figure 1, page 6.
3. Manipulate the trowel in the mortar by cutting and working the mortar around on the mortar board. Whoops! Be careful, watch your clothing and try not to splash mortar onto the floor. See Figure 2, page 6.

LEARNING PRACTICE (cont'd):

4. Cup and pick up a full trowel of mortar spreading it onto the training board (2 x 4). Remember how the instructor did it. Watch it! The elbow of the trowel hand should be away from the body. The awkward feeling will quickly leave and a comfortable habit will come about in a short time. See Figures 3 and 4, page 6.
5. Using the trowel, after spreading the mortar, lightly furrow the mortar, using the tip of the trowel; careful not to get the furrow too deep.
6. Remove the mortar from the training board with your trowel and place it on the mortar board. Did the mortar dry out a little? Add water to the mortar to make it more workable - we call this tempering the mortar.
7. Repeat this operation until the knack of handling the trowel, and consistently spreading two full trowels of mortar on the board until you can uniformly cover 36 inch distance.
8. Keep practicing the handling of the trowel by cupping and picking up the mortar, and spreading and furrowing the mortar.

LEARNING PRACTICE (cont'd):

9. When you think you can do it like a pro, call your instructor over and show him how good you are at it.

[illegible] the [illegible] you passage on working with your hands. Go to the next unit for more goodies.

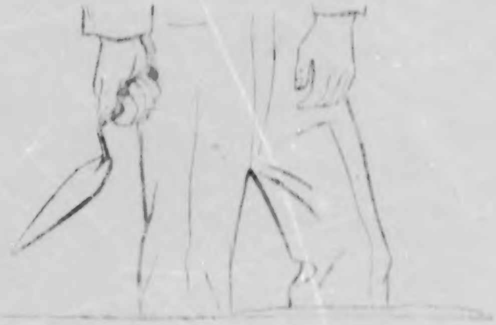

FIGURE 1 CORRECT WAY TO HOLD A TROWEL

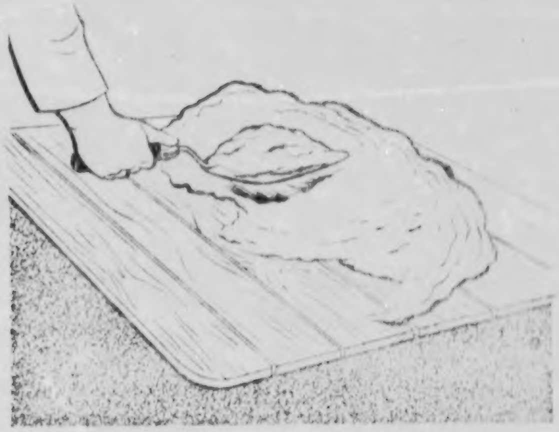

FIGURE 2 PROPER WAY TO PICK UP MORTAR

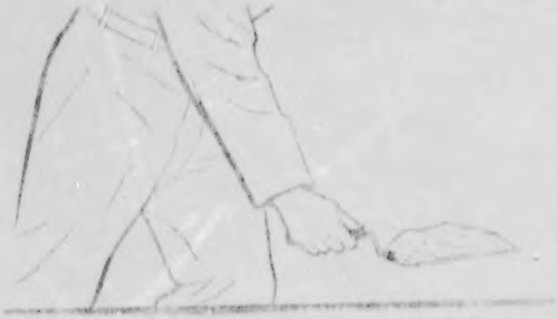

FIGURE 3 FULL TROWEL OF MORTAR

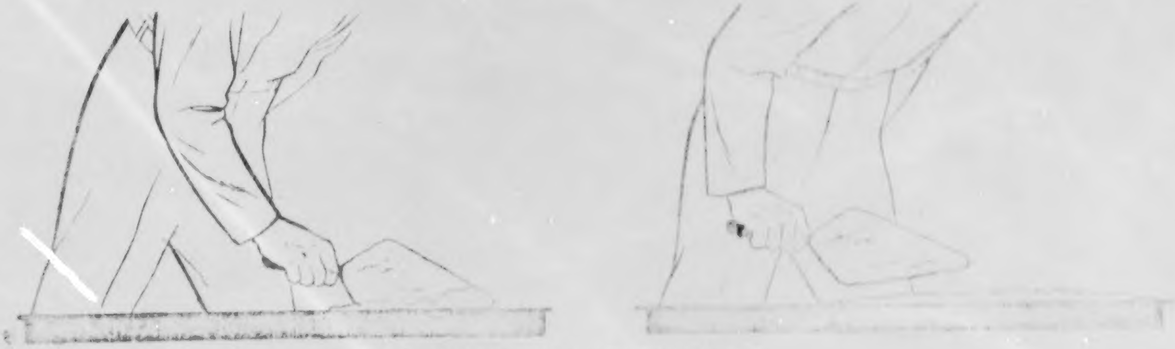

FIGURE 4 SPREADING MORTAR

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CLUSTER: MASONRY
COURSE: BRICKLAYING

BM-IV

UNIT IV: CONSTRUCTION OF A STRETCHER BRICK WALL

PREREQUISITES: UNIT III, TASK PACKAGE 1

RATIONALE:

In the construction of a brick masonry wall, either in residential or commercial work, the mason must know how to construct a stretcher brick wall. Probably the most important factor in determining the success of masonry work is quality workmanship. It is self-evident to say that a masonry wall can be no better than the materials and workmanship which go into it. There are many types of brick walls, such as veneered walls, retaining walls, curtain walls, panel walls, and many others that are constructed using a stretcher brick bond in the wall. Now, continue by reading the General and Specific Objectives, and the Learning Activity, which explains procedures of this unit and how you are to proceed in performing the tasks.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to acquire the necessary skills to construct a short 4" wythe stretcher wall.

OBJECTIVE (cont'd):

SPECIFIC:

Upon completion of this task package you will be able to:

a. butter and mortar on the head end of the bricks.

b. lay alternate stretcher courses using forehand and backhand techniques, aligning face of brick by eye.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Construction of a Stretcher Brick Wall consists of a single task package. Observe that Unit III, task package 1, should be completed prior to beginning this unit. As you do the required work on this task package, study the reading assignments, answer questions and perform the objectives as directed.

The title of the task package contained in this unit is:

TASK PACKAGE 1: CONSTRUCTING A STRETCHER BRICK WALL

If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT IV: CONSTRUCTION OF A STRETCHER BRICK WALL

TASK PACKAGE I: CONSTRUCTING A STRETCHER BRICK WALL

PREREQUISITES: UNIT III: TASK PACKAGE I

RATIONALE:

The manipulative skills of properly handling a trowel, holding the brick, and placing the brick in the wall are necessary for efficient masonry work. In this task package you will combine all the skills learned in previous task packages, and you will experience a major accomplishment in constructing your first wall. If you learn to build a satisfactory wall, this skill could lead you to an interesting and rewarding career. (Remember: it is not where you start in life, but how far you go.) Good luck in constructing your first wall!

OBJECTIVE:

Upon the completion of this task package you will be able to:

A. Butter and mortar on the head end of the bricks.

B. Lay alternate stretcher courses using forehand and backhand techniques, aligning face of brick by eye. Your performance will be rated in accordance with instructor's check list.

LEARNING ACTIVITY:

1. View sound slide package #BM-IV-1.
2. Read: Masonry Simplified, Volume I, page 275, Head Joints in Stretcher Courses.
3. What do you need to be able to butter the head end of a brick? State in writing the answer to this and all subsequent questions for your instructor's evaluation.
4. One of the methods of buttering a brick is by placing a dab of mortar on the corners of a brick in place on a wall. What is the other recommendation for buttering a head joint?
5. Take a good look at the full head joint used in Figure 10 on page 275. This is the proper way.
6. Read Masonry Simplified, Volume I, page 274, Bed Joints in Stretcher Courses, and page 276, Closure Joint in Stretcher Courses. Look at Figure 9. See what the brick are lying on; it is not a water-bed; if it were they would float away.

LEARNING PRACTICE:

Observe very carefully how your instructor butters and lays brick using the forehand and backhand techniques. They may look simple but it takes a craftsman time and patience to develop this artful skill.

Tools & Equipment

1. Trowel
2. Mortar board

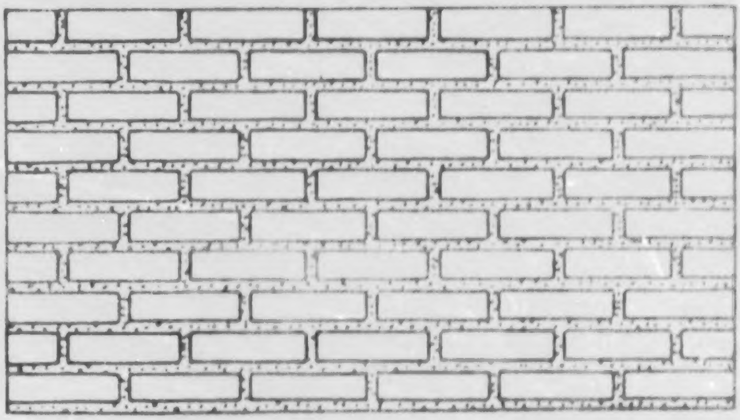
LEARNING PRACTICE (cont'd):

1. Spread mortar on deck approximately five feet in length. If you are having difficulty now, go back and review Task Package III-1.
2. Lay the first brick at the right hand end of the wall-bed and head joints to be 3/8" to 1/2"; butter the next bricks one at a time, laying a total of six bricks.
3. Lay alternate courses using the backhand and forehand techniques, aligning all the brick by eye. Repeat all actions used in laying the first course to the height shown in Figure I, page 4.
4. Secure half brick to be used on the end of the wall from the instructor. Have your instructor check your wall at the end of the tenth course.

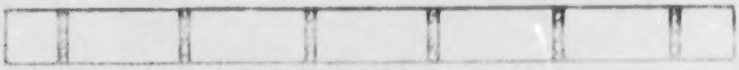
The Great Wall of China was built one brick at a time; that's the way all walls are built.

How do you think the owl got so wise? He did another and another and another task package.

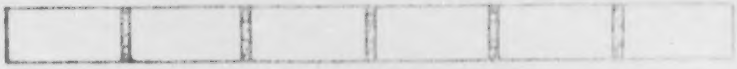
A 4" ALL STRETCHER WALL



Front Elevation



2nd, 4th, 6th, 8th and 10th course plan



1st, 3rd, 5th, 7th and 9th course plan

Figure 1

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CLUSTER: MASONRY
COURSE: BRICKLAYING

UNIT V: STRUCTURAL BONDING OF MASONRY WALLS

PREREQUISITES: NONE

RATIONALE:

Bond is not only the technical and mechanical procedure of cementing bricks together to form a strong and weather resistant wall, but also presents numerous possibilities for making a brick wall face an object of beauty. This is accomplished by the header brick that is used to overlap one wythe of wall to another as it also forms a pattern and the face of the wall such as the Flemish bond, English bond, common bond and the Dutch bond.

The structural bond developed by using metal ties and adhesion of grout enable the bricklayer to lay up walls by projecting and recessing brick from the face of the wall as the conventional pattern bonds used on stretcher brick wall. Continue now by reading the General Objectives for the unit and the Specific Objectives for each task package within the unit. Proceed, by reading the Learning Activity, which explains what you are to do in this unit and how you are to proceed in performing the tasks.

OBJECTIVES:

General:

Upon completion of this unit package you will be able to understand the procedures for structurally bonding a masonry wall.

Specific:

Upon completion of this task package you will be able to describe in writing how, where, and when each of the three methods of structural bonding is used in the construction of a wall:

a. overlap method.

b. metal ties.

c. adhesion of grout.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit on Structural Bonding of Masonry Walls consists of a single task package. As you do the required work on this task package, study the reading assignments, answer questions and perform the objectives as directed.

TASK PACKAGE 1: STRUCTURAL BONDING OF MASONRY WALLS is the title of the task package contained in this unit. Complete the work on the task package as outlined. If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above

UNIT V: STRUCTURAL BONDING OF MASONRY WALLS

TASK PACKAGE 1: METHODS OF STRUCTURALLY BONDING A WALL

PREREQUISITE: NONE

RATIONALE:

Don't let this package give you the gout. It's all about grout and two other methods of structurally bonding walls. Learn about them here.

The introduction of new materials has aided the masonry construction industry to develop into one of the giant industries of the country. In this task package you will gain the knowledge of the three methods of structurally bonding a wall. One of these, the overlap method, does not fit into the new materials or techniques of recent years; but the other two, metal-tied walls and adhesion of grout, were made possible by the manufacturing of many types of ties and reinforcing materials now available in the industry.

Continue by reading the Objective, doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to describe in writing how, where and when each of the three methods of structural bonding is used in the construction of a wall:

a. overlap method.

b. metal ties.

c. adhesion of grout.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-V-1, starring Comer Grout.
2. Read pages 25-27 of Bricklaying Vocational Training, the section Structural Bonds.
3. When possible, visit a construction site to observe which method of structurally bonding a wall is used.
4. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

1. Obtain, from the instructor, the paper needed to record your answers for this Learning Practice. The material on pages 25-27 of Bricklaying Vocational Training is the basis of this information.
2. In the overlapping method of structurally bonding a wall, the ________ and the ________ bond are the bases of this method.
3. List three of the pattern bonds shown in figure 5-4, page 26, which describes how and when the structural bonding is accomplished by overlapping the masonry units.
4. According to figure 5-5, page 27, structural bonding of masonry walls with metal ties is used in both ________ walls and ________ wall construction.
5. Most building codes permit the use of metal ties in solid masonry walls. The ties are spaced so that at least one tie occurs every 4 1/2 ________ feet of wall space.
6. The maximum vertical distance (elevation) between ties shall not exceed ________ inches and the maximum horizontal distance shall not exceed ________ inches.
7. Structural bonding of solid and reinforced brick masonry walls is accomplished by ________ which is poured into the cavity between ________ of masonry.

LEARNING PRACTICE (cont'd):

8. Grout is ______________ to which sufficient water has been added.

9 The metal tie method is recommended for ____________ walls.

10. One of the advantages of the metal tie method over the other two is the ____________ of construction.

11. Have the instructor evaluate your work from his checklist.

Structural bonding of walls is like cementing friendships.

Go on to the next task package.

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CLUSTER: MASONRY
COURSE: BRICKLAYING

UNIT VI: MASONRY UNIT POSITIONS AND PATTERN BONDS

PREREQUISITES: NONE

RATIONALE:

Brick masonry as a building material is most interesting because of the unlimited variation of placing the brick in a wall. The various bonds and/or patterns styles are numerous and each requires great skill and care.

Many other wall facing materials have been developed in the recent years; however no other structural material offers the same scope either in the colors and textures of available brick or the variety of wall patterns and bonds obtainable. No other material offers the same possibilities for the exhibition of skill and perfection in the field of masonry. One can attain a degree of appreciation of the creativeness of pattern walls much as the people of the arts can obtain for their products. Continue now by reading the General and Specific Objectives, and the Learning Activity for the unit.

OBJECTIVES:

General:

Upon completion of this unit package you will be able to look at a brick wall and identify the pattern bond by the arrangement of the brick position in a wall.

OBJECTIVES (cont'd):

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Do the following:

    a. name in writing, from illustrations, the correct terms that relate to the position of a brick in a wall.

    b. draw a composite wall using each of the correct positions of brick as a design.

    Your performance will be evaluated in accordance with the instructor's checklist.

2. Identify in writing, by name, the stretcher, common, stack. Flemish and English bonded wall designs. Your performance will be evaluated in relation to the material covered in Bricklaying Vocational Training, pages 27 and 28.

LEARNING ACTIVITY:

This unit on Masonry Unit Positions and Pattern Bonds consists of two task packages which should be completed in numerical order. As you do the required work on each task package, perform readings, answer questions, and complete the other activities as directed. The titles of the packages contained in this unit are:

TASK PACKAGE 1: IDENTIFYING BRICK POSITIONS

TASK PACKAGE 2: IDENTIFYING PATTERN BONDED WALL

LEARNING ACTIVITY (cont'd):

If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT VI: MASONRY UNIT POSITIONS AND PATTERN BONDS

TASK PACKAGE 1: IDENTIFYING BRICK POSITIONS

PREREQUISITES: NONE

RATIONALE:

Perhaps in your observation of brick houses and buildings you have noticed that the brick seemed to be placed in different positions. The brick was placed in these positions on purpose in order to create pleasing patterns - and also to serve different functions. The brick mason needs to have knowledge of the different brick positions and the resulting functional uses. You will find that there are only six possible positions, which when learned and understood, will allow you to be able to recognize all patterns. We will not cover one of the brick positions, known as the sailor, in this task package since it is very rarely used. Would you like to find out more about brick positions? Well, you are in luck because that is what this task package covers.

Read on to your Objective, Learning Activity, and Learning Practice as they will be the guide post to new horizons. Keep clearly in mind your objectives.

OBJECTIVE:

Upon the completion of this task package you will be able to:

a. name, in writing, from illustrations, the five correct terms that relate to the position of a brick in a wall.

b. draw a composite wall showing each of the five correct positions of brick as a course.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Read Vocations Training, pages 27 and 28. Look closely at figure 5-1 and figure 5-2.
2. Read Masonry Simplified, Volume I, pages 262 through 269.
3. View sound-slide BM-VI-1.
4. Observing the brick positions, you will see that two of these, besides being decorative, are functional.
5. Is it true that the stretcher position has its longest length laid with the length of the wall?
6. Looking at low brick walls in the area where you live, see if you can find any of the two functional brick pattern positions. After you answer these questions have your instructor check your results.

LEARNING ACTIVITY (cont'd):

7. You will be able, from the illustrations in the Learning Practice, to select the correct shape to correspond to a given brick position.

LEARNING PRACTICE:

1. From the illustration figure 1-5 found on page 4 write the name of position of brick in the blank spaces provided. Is that book open? It shouldn't be; because if you do not master the identification of the positions of brick it will be much more difficult to do the assignment in the next task package. Your knowing the positions of brick will make your next experience of learning much simpler.
2. On a separate sheet of paper draw, by using each of the five brick positions as a course, a wall in the order listed:

   1st course soldier
   2nd course stretcher
   3rd course header
   4th course rowlock
   5th course shiner

   The brick is to be 1/4" high and 3/4" long.

As you're walking around the campus with your friends, point out to them some of these brick positions. Three are used very often. Aren't you glad you're not as lazy as some people?

Terms Applied to Varied Brick Positions

Figure 2

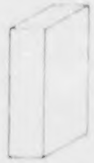


Figure 1

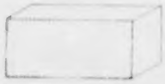


Figure 3

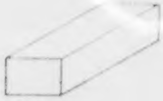


Figure 4

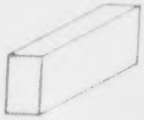
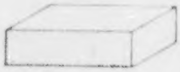


Figure 5



UNIT VI: MASONRY UNIT POSITIONS AND PATTERN BOND

TASK PACKAGE #2: IDENTIFICATION OF PATTERN BONDED WALL

PREREQUISITES: TASK PACKAGE VI-1

RATIONALE:

In order for walls, chimneys and other structural members to be strong, solid, and durable, it is necessary that the brick be placed in such a manner that they are bonded together to form a well-structured unit. The mortar, covered in Task Package III-1, tends to bind the brick together, but unless the individual brick is correctly placed, thereby bonding it correctly, a wall will not have strength or durability. In this package we consider the wall face design that is produced by different brick arrangements in the wall. To you as a bricklayer, knowing the pattern bonded wall designs is like the carpenter's knowing the different facing materials that he places on the exterior of a frame building. There are many more pattern bonded wall designs than you will cover in this package, but the five - stretcher, common, stock, Flemish and English - are the most frequently used in constructing a wall.

This package has been developed to provide you with a Learning Activity and Learning Practice to direct you towards

RATIONALE (cont'd):

attaining the objective [illegible] back at [illegible] Skills. [illegible] as you feel necessary

OBJECTIVE:

Upon completion of this task package you will be able to identify, [illegible] the material covered in Br[illegible] 27 and 28.

LEARNING ACTIVITIES:

1. View sound-slide package [illegible]
2. Read Bricklaying Vocational [illegible] 27 and 28, the section on Pattern bond[illegible]
3. Read Masonry Simplified [illegible] 269, the section on Bonding [illegible]
4. While reading, observe [illegible] position of brick and the name [illegible]
5. Compare the course [illegible]

Common bond [illegible]

LEARNING ACTIVITY [illegible]

1. [illegible] English bond.

2. This leaves the stack bond to stand alone, but it cannot, [illegible] it needs a supporting wall.

[illegible]

[illegible] draw the wall designs listed below. Do not [illegible] until you have completed all of the [illegible] illustration you will draw each wall [illegible] long. All illustrations will have [illegible] courses in height and six bricks in length.

1. Stretcher bond.
2. Running bond [illegible] header courses.
3. Stack bond.
4. Flemish bond, [illegible] stretcher and header brick.
5. English bond, [illegible] stretcher course.

A wall is not a wall, unless properly bonded, but a stack of brick. Take a bow, you've [illegible] it!

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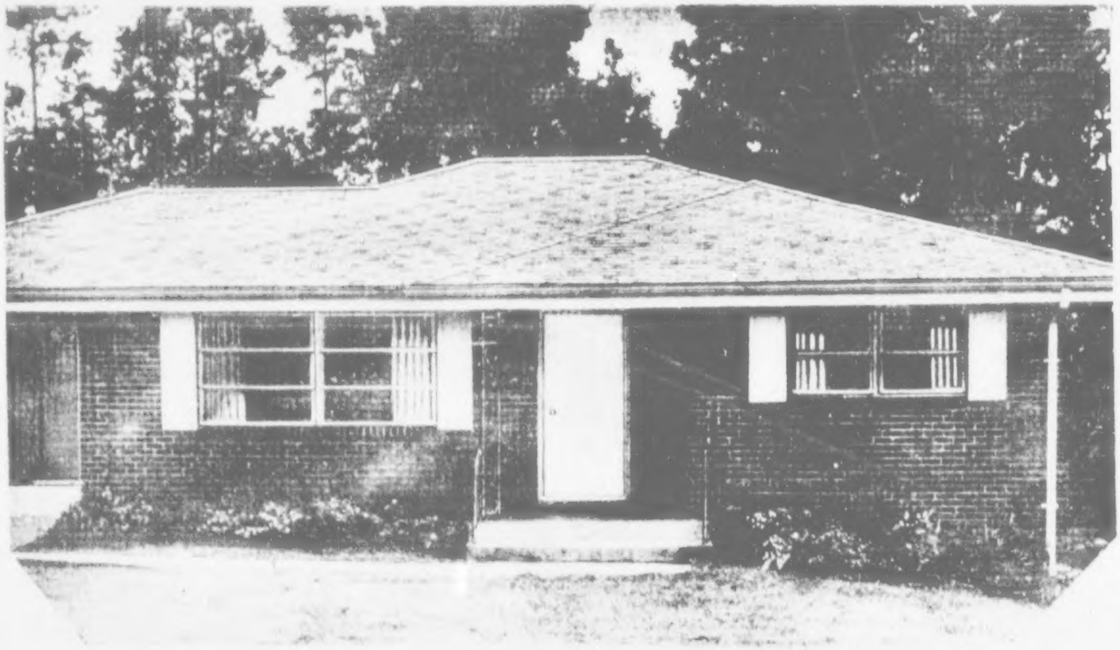


CLUSTER: MASONRY
COURSE: BRICKLAYING

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] construct numerous bonds and [illegible] work. Your future [illegible] to construct the [illegible] as well as learning [illegible] you will develop the manipulative [illegible] as well as performing the every- [illegible]. The [illegible] you achieve in the completion of [illegible] will enable you to perform more [illegible] in the course. Continue [illegible] the [illegible] and the Learning Activity, [illegible] how to proceed in [illegible].

[illegible]

[illegible]

[illegible] you will be able to construct [illegible] wall.

[illegible]

[illegible]

Upon completion of the task packages for this unit, you will be able to:

1. Lay an 8" stretcher wall between established leads, maintaining the following:
   a. 3/8 to 1/2" mortar space between each brick lengthwise.
   b. ± 1/4" for overall height for a given number of courses or overall wall height.
   c. All brick laid to a line.

   Your performance will be evaluated in accordance with the instructor's checklist.
2. Lay an 8" return corner in stretcher bond, maintaining the following:
   a. 3/8 to 1/2" mortar space between each brick lengthwise.
   b. ± 1/4" for overall height for a given number of courses or overall wall height.
   c. Squared, leveled and plumbed courses.

   Your performance will be evaluated in accordance with the instructor's checklist.
3. Lay [illegible] stretcher wall between established leads, maintaining the following:
   a. 3/8 to 1/2" mortar space between each brick lengthwise.

[illegible] (cont'd):

b. ± 1/8" for overall height for a given number of courses and wall height.

c. All brick laid to the line.

d. Install metal ties in mortar.

Your performance will be evaluated in accordance with the instructor's checklist.

4. Lay up an 8" [illegible] single corner lead in stretcher bond maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. All courses squared, leveled, and plumbed.

d. Install metal ties in mortar.

Your performance will be evaluated in accordance with the instructor's checklist.

5. Lay up two 4" x 12" pilasters in an 8" stretcher wall between established leads, maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. All brick in wall laid to a line.

d. All pilaster brick leveled and plumbed.

[illegible] (Cont'd):

Your performance will be evaluated in accordance with the instructor's checklist.

[illegible]. Lay up an 8" intersecting stretcher wall between established leads maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. all brick in main wall laid to a line.

d. all brick in the short intersecting wall squared, leveled and plumbed.

e. install metal ties in mortar.

Your performance will be evaluated in accordance with the instructor's checklist.

9. Lay up an 8" common bonded wall between established leads, maintaining the following:

a. 3/8" to 1/2" mortar-space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. all brick laid to a line.

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVES (cont'd):

5. Lay up a 10" cavity wall, using stretcher bond maintaining the following:
   - a. 1/4" to 3/8" mortar space between each brick lengthwise.
   - b. ± 1/8" for overall height for a given number of courses and wall height.
   - c. all brick laid to the line.
   - d. ± 1/8" for width of wall.

   Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

In order to complete this unit successfully you should begin your work on Task Package 1, and then proceed to complete each package in order until you have finished the total of eight packages in this unit. You will observe that all of the packages have a prerequisite; and, in constructing the walls, each has a degree of difficulty greater than the one before. In the packages you will be asked to view a sound-slide program, read the assignments, and construct the wall following these procedure directions.

The number and names of the task packages included in this unit are as follows:

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 1: LAYING UP A 4" STRETCHER WALL

TASK PACKAGE 2: LAYING UP A 4" RETURN CORNER LEAD

TASK PACKAGE 3: LAYING UP AN 8" STRETCHER BRICK WALL

TASK PACKAGE 4: 8" RETURN ANGLE CORNER LEAD

TASK PACKAGE 5: 4" x 12" PILASTER IN AN 8" STRETCHER WALL

TASK PACKAGE 6: AN 8" INTERSECTING STRETCHER WALL

TASK PACKAGE 7: 8" WALL IN COMMON BOND

TASK PACKAGE 8: 10" CAVITY WALL IN STRETCHER BOND

Proceed with your work as outlined above and when you are ready for the unit evaluation, contact your instructor.

UNIT VII: CONSTRUCTION OF BRICK WALL USING APPROPRIATE PATTERN BOND

TASK PACKAGE #1: LAYING UP A 4" STRETCHER WALL

PREREQUISITES: UNIT I, TASK PACKAGES 1 - 2; UNIT IV, TASK PACKAGE 1;
UNIT VI, TASK PACKAGE II

RATIONALE:

The 4" stretcher bonded wall is one of the most extensively used bonds for the construction of brick veneer and partition walls. It is known as stretcher bond since all of the courses are laid using the stretcher position of a brick. Familiarity with the 4" stretcher bonded wall pays dividends to the mason.

In this task package you will learn to properly position the mason line on established leads and to lay brick to the line. This 4" stretcher wall is only the beginning of many different types of walls you will be building in the near future. In this task package you will also gain skill in building a stretcher bonded wall. Continue by reading the Objective and performing the Learning Activities and the Learning Practice.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a 4" stretcher wall between established leads maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. + 1/8" for overall height for a given number of courses and wall height.

c. All brick laid to a line.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #BM-VII-1.
2. Refer to Unit III, Task Package #1, Unit VI, Task Packages #1 and #2.
3. View figure 1, page 5.
4. Read and study Masonry Simplified, Volume I, pages 264 and 265.
5. This completes the Learning Activity. Now begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel

4. Mason's line

LEARNING PRACTICE (cont'd):

2. Mortar board
3. Brick hammer
5. Corner blocks or pins
6. 6 ft. spacing rule

1. Check with the instructor for the type of brick to be used, and the height of the wall; then determine the brick spacing and mark them on the leads.
2. Stretch a mason line on established corner leads.
3. Spread mortar on deck.
4. Lay a brick on the bed of the mortar to a line. Be careful not to crowd the line; this will cause a bulge in the wall. Also try to maintain a 1/16" space between the top edge of the brick and the mason line. Maintain a 3/8" to 1/2" mortar space between brick.
5. Now that you are finished with the first course you are ready to start the second course. (Be sure to check that no brick are below the line).
6. Secure half brick from instructor.
7. Move mason line up to the second course, making sure the line is adjusted to the correct position on the lead.
8. Spread mortar on top of the first course of brick.
9. On one end of the wall set a half brick in position so it is flush with the bottom brick, at the same time keeping the top edge of the half brick to the line.

LEARNING PRACTICE (cont'd):

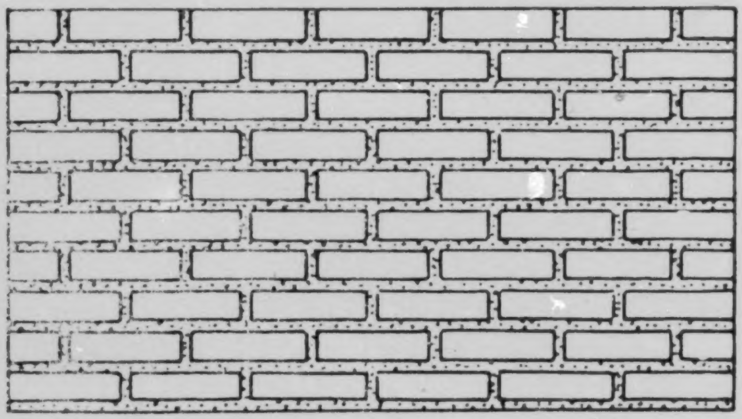
10. Fill in the remaining section of the wall with brick maintaining the 3/8" to 1/2" mortar joint or head joint.

11. Repeat all operations previously used for the first two courses in completing the remaining courses to the given height ± 1/8".

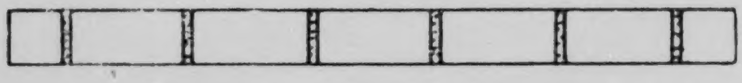
12. When finished for the day, clean up work area and tools.

Well, since you finished the wall, was it as easy as you first thought? It probably wasn't, but don't be discouraged; you will get much better as you keep trying. Remember, the longest journey begins with the single step.

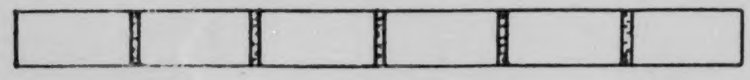
A 4" ALL STRETCHER WALL



Front Elevation



2nd, 4th, 6th, 8th and 10th course plan



1st, 3rd, 5th, 7th and 9th course plan

Figure 1

UNIT VII: CONSTRUCTION OF A BRICK WALL, USING APPROPRIATE PATTERN BOND

TASK PACKAGE #2: LAYING UP A 4" RETURN CORNER LEAD

PREREQUISITES: UNIT I, TASK PACKAGES 1, 2, 5; UNIT VII, TASK PACKAGE 1

RATIONALE:

In this package you will be able to construct a 4" return corner lead. To accomplish this, you will be using the "carpenter's" square and level to assist you in construction of the wall. All buildings have corners; therefore, you must master the necessary skills in this task package. A person who develops a high degree of skill in building corner leads is in a much greater demand than a person who can only lay bricks to a line. Now, read your Objective and follow the instructions outlined in this package.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a 4" return corner in stretcher bond maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height given number of courses and wall height.

c. squared, leveled, and plumbed courses. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View figure 1, page 4.
2. View sound-slide package #BM-VII-1.
3. Observing figure 7 in this task package, your attention becomes centered on the 1st course layout which needs to be correctly positioned to have your corner lead come out at the correct number of courses in height.
4. Return corner leads are sections of a wall. What is the function of a return corner lead? Answer to be written and given to your instructor.
5. There are variations in the construction of a corner lead. Observe buildings in the area and report verbally to your instructor.
6. Proceed to the Learning Practice unless you have questions. If so consult with your instructor.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. 6' spacing rule
4. Mortar board
5. Brick hammer
6. "Carpenter's" square

1. Check with the instructor for the height of the 4" return corner lead.
2. Determine the brick spacing (UnitI, Task Package 5) and use the correct course number to check the height as the wall is being built, course by course.

LEARNING PRACTICE (cont'd):

3. Lay out the corner lead dry and square, using the "carpenter's" square and level as an extension leg with the square.

4. Using figure 1, page 4 as a guide, bed up in mortar brick #1-2-3, before disturbing the other brick. Align the brick to your layout and level, leveling from the corner brick.

5. Lay in the remainder of the course, aligning and leveling the brick.

6. Continue with the second course; lay up the corner brick leveling and plumb it and the last possible brick on the tail end of the course. Level the last two brick to the one on the corner. Plumb them from the first course. Lay up the remainder of the course.

7. Repeat all operations needed in completing the remainder of the lead, racking back 1/2 brick on each course, until the given wall height ± 1/8" has been reached.

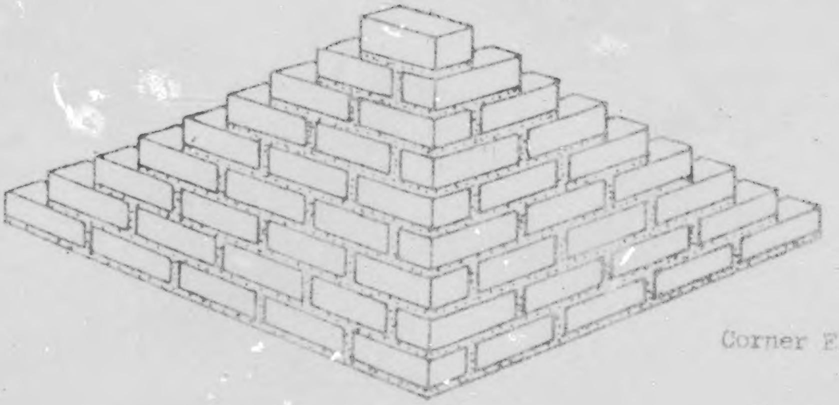
8. Remember, each course as it is laid must be leveled and plumbed to ± 1/4". You are not at this time building the Leaning Tower of Pisa or a roller coaster.

9. When finishing up for the day clean up work area and tools, placing your tools, clean and dry, in the tool room.

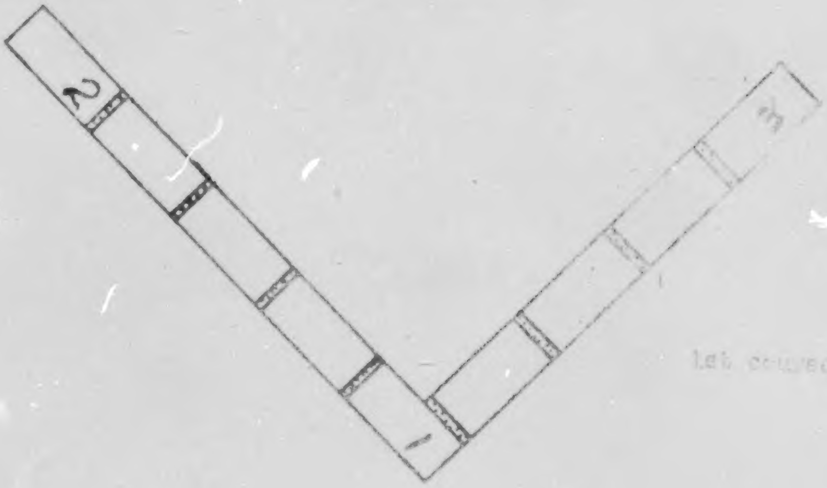
Right on; in the near future you can look back and realize how you became a good lead man.

Peristence has its rewards in helping the individual to accomplish whatever he sets out to do. Do you have persistence?

A 4" RETURN CORNER IN STRETCHER BOND



Corner Elevation



1st course plan

Figure 1

UNIT VII: CONSTRUCTION OF A BRICK WALL, USING APPROPRIATE PATTERN BOND

TASK PACKAGE #3: LAYING UP AN 8" STRETCHER BRICK WALL

PREREQUISITES: UNIT V, TASK PACKAGE 1; UNIT VII, TASK PACKAGE 1

RATIONALE:

Now you are going to be given the opportunity to see how good you are at using the overhand and veneering technique at constructing an 8" stretcher brick wall. Don't be discouraged if at first you experience some difficulty in being able to use these techniques. An 8" stretcher brick wall is frequently used in building retaining partition and exterior walls in commercial brick work. Since commercial brick work accounts for approximately three times more than residential work, it is highly important that you have a thorough working knowledge with this type of wall construction. Much of the work of a mason involves the building of 8" stretcher brick walls.

OBJECTIVE:

Upon the completion of this task package you will be able to lay-up an 8" stretcher brick wall between established leads maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. +1/4" for overall height for a given number of courses and wall height.

c. all brick laid to a line.

d. Install metal ties in mortar.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide program BM-VII-2.
2. Review Unit V, Task Package #1, and Unit VII, Task Package #1.
3. Read *Masonry Simplified*, Volume 1, pages 274 and 275 and study the illustrations.
4. View Figure [illegible], page 5. Do you understand this illustration; if not check with your instructor.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 6 ft. spacing rule
3. Mason's line
4. Corner blocks or pins
5. Brick hammer
6. Mortar board

1. Obtain from your instructor five metal ties and information regarding the wall height; then determine the brick spacing and mark the points on the leads.
2. Dry bond the 8" wall using figure 2, page 5, to achieve the correct spacing between the brick; notice that the width of the wall is the length of a brick.
3. Stretch the lines from leads at correct spacing marks.
4. Remove the four corner bricks from the dry lay-out, spread mortar, and lay the brick on the mortar in proper position to the other brick. Remove loose brick, spread mortar and lay the brick to a line. You will be using the objectives of Unit III, Task Package 1, in positioning the brick to a line, overhand and veneering techniques.
5. Position line to second course on the corner lead.
6. Bed-up the two corner brick aligning them to the first course corner brick; figure 2 shows the length of these brick to be the width of the wall. Spread mortar and lay the remaining bricks for the course to the line.
7. Adjust line to next position on the lead and place metal ties

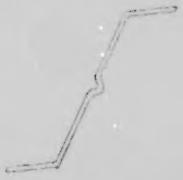
LEARNING PRACTICE (cont'd):

on the bed of course #2. (Repeat on top of course 8.)

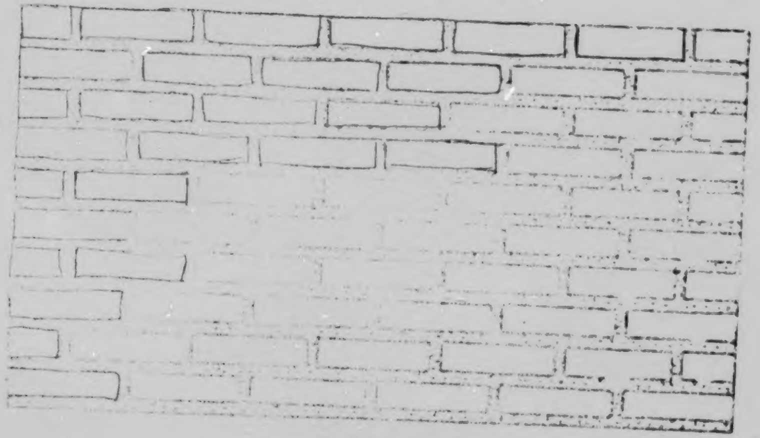
8. Fill in the remaining section of wall to the given height, ± 1/8". Are you maintaining the 3/8" to 1/2" on the head joints? Are metal ties being embedded properly? Unit V, Task Package 1 is the reference for these. Are they missing from on top of the 8th course?

Proceed at your own pace; Abe Lincoln did.

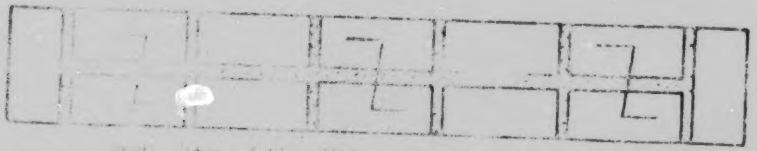
AN 8" STRETCHER BONDED WALL



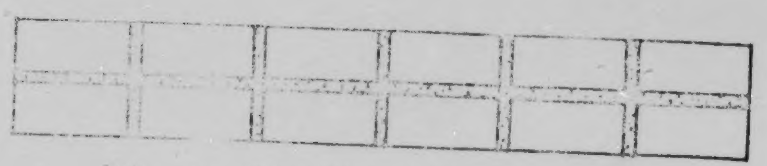
Z BAR WALL TIE



Front Elevation



2nd, 4th, 6th, 8th and 10th course plan



1st, 3rd, 5th, 7th and 9th course plan

Figure 2

UNIT VII: CONSTRUCTION OF BRICK WALL USING APPROPRIATE PATTERN BOND

TASK PACKAGE # 4: 8" RETURN ANGLE CORNER LEAD

PREREQUISITES: UNIT VII, TASK PACKAGES # 2 and 3

RATIONALE:

In the previous task package you learned how to construct a 4" return corner lead. Now you are going to construct an inside and outside corner lead while working on one side of the wall. Does this sound impossible or difficult? If you follow the instructions outlined in this task package it will be as easy as laying brick to a line. It is too costly to erect scaffolding on the inside and outside of the wall, and you would spend much more time in constructing these corners by working on both sides of the wall. You would be physically tired to climb up and down a twenty-foot wall and work off two scaffolds to construct a corner lead. Do you get the message? Learning the content of this task package is better than climbing the walls.

OBJECTIVE:

Upon completion of this task package you will be able to lay up an 8" return angle corner lead in stretcher bond maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. all courses squared, leveled and plumbed.

d. install metal ties in mortar.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Review Unit VII, task packages # 2 and # 3.
2. At the resource center view sound-slide package # BM-VII-2.
3. View figure 3 of this task package and observe the 1st and 2nd course brick placements. The empty space at each tail end of the second course is known as toothing. Knowing this procedure enables you to build a higher corner lead.
4. If you have any questions, consult with your instructor before starting the Learning Practice.

LEARNING ACTIVITY (cont'd):

5. This completes your Learning Activity; begin work on the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. "Carpenter's" square
2. 6' spacing rule
3. Trowel
4. Level
5. Mortar board
6. Brick hammer

1. Check with your instructor for the height of the 8" corner lead.
2. Determine the brick spacing and use the correct course number to check each course height as you construct your corner lead.
3. Using figure 3, page 5, dry lay out the job as shown on the first course plans, squaring with the "carpenter's" square and then use the level to align remaining brick in wall.
4. Remove bricks numbered 1, 2, 3, without disturbing remaining brick; bed up these brick in mortar without disturbing the other brick, leveling from # 1 to # 2 and # 3. Fill in remainder of the outside course, bedding the brick in mortar.
5. Lift out of position bricks # 5, # 6, and # 7 from inside course, repeating the procedure used for the outside course. If it is not working out for you, check with your instructor.

LEARNING PRACTICE (cont'd):

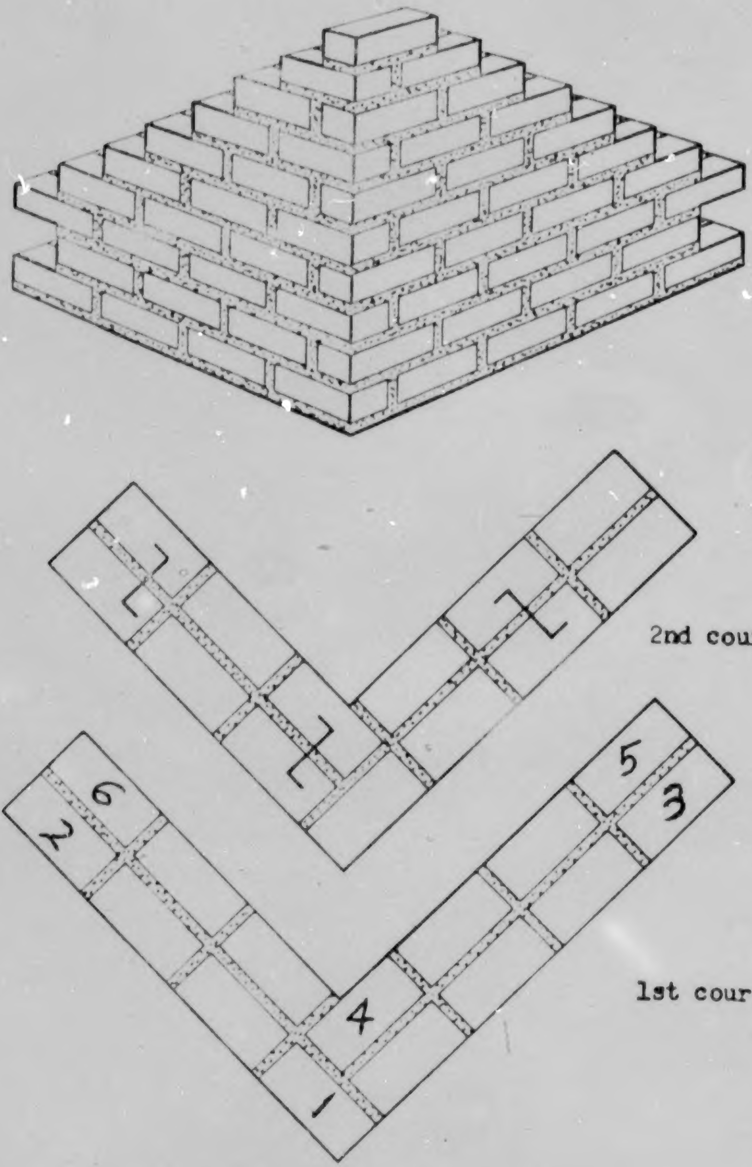
6. Construct the remaining section of corner lead to its given height ± 1/4", using information gained in doing Unit VII, task packages # 2 and # 3. Courses to be level and plumb ± 1/4".

7. Metal ties are used in the corner to structural bond the two wythes into one wall. Do you realize you are laying brick with the overhand and veneering methods as well as forehand and backhand techniques?

8. Follow the yellow, green, blue, red, white, and gray brick roads to success as a mason.

AN 8" RETURN CORNER

Figure 3



2nd course plan

1st course plan

UNIT VII: CONSTRUCTION OF BRICK WALL USING APPROPRIATE PATTERN BOND

TASK PACKAGE #5: 4" x 12" PILASTER IN AN 8" STRETCHER WALL

PREREQUISITES: UNIT VII, TASK PACKAGE #5

RATIONALE:

Clear the deck! Here comes Mr. Pilaster, our structural friend.

Many of the walls that you will be building need to be strengthened or reinforced depending upon the situation, so that they can adequately support the total structure of a building. A pilaster is such a structural member that it is used in strengthening and reinforcing walls. Pilasters are used in commercial buildings where walls must support a heavy load, such as steel and concrete girders. Also pilasters are used to strengthen a wall for lateral support such as in reinforced foundation walls. Many of the building codes specify the construction of pilasters with a wall for reinforcement.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up two 4" x 12" pilasters in an 8" stretcher wall between established leads maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall heights.

c. all brick in wall laid to a line.

d. all pilaster brick leveled and plumbed.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #BM-VII-2.
2. Review Unit VII, Task Package 4.
3. View Figure 4 in this task package and observe the brick placements of the pilaster on the 1st and 2nd course plan.
4. Read Masonry Simplified, Volume I, pages 303-305. Take note why it is necessary to use pilasters in wall construction and why they should be properly tied into the main wall.
5. Consult with your instructor if you have questions. If not, now proceed on with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. "Carpenter's" level
4. Mason line
5. Corner blocks or line pin
6. Brick hammer
7. 6' spacing rule
8. Mortar board

1. Check with your instructor for the height of the wall.
2. Determine the brick spacing and use the correct course number to check the established corner lead for height.
3. Using figure 4 in this task package dry lay out the 8" wall with two 4" x 12" pilasters positioned as shown on the first course plan. Observe, in particular, the pilaster section to the manner of the brick placement for the wall. So it's different, don't fear, the pieces will all fall into place by following the correct procedures in constructing the wall.
4. Bed up brick #1 and #2; remove loose brick from alignment, replacing them in mortar to the line. Repeat with brick #3 and #4 wall section with the pilaster assembly. Place metal ties in position as shown on plan view. Place on top of 1st and 8th courses.
5. On the second course, after line has been raised to correct

LEARNING PRACTICE (cont'd):

height on the lead, position brick #1 and #2 as indicated from 2nd course plan of figure 4. Lay the remaining brick on to the course. Beware of the brick arrangement at the pilaster section. They must be so arranged to receive the maximum strength required of the pilaster to the main wall. Also, pilasters must be parallel to the face of the wall.

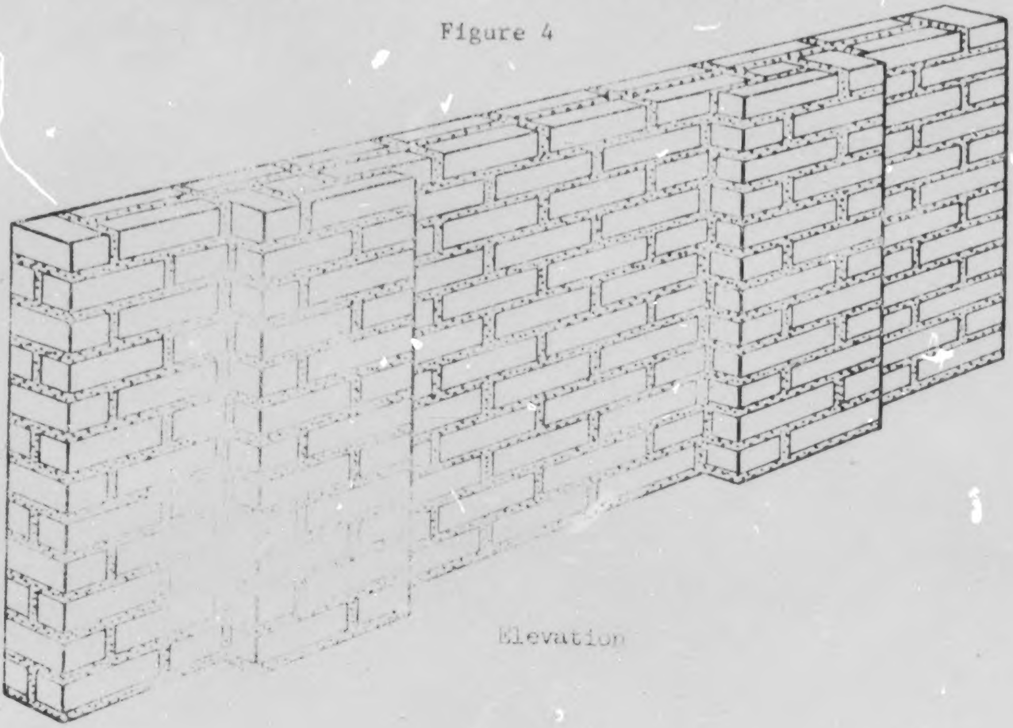
6. Move line up to successive lead spacing marks and lay brick onto the wall, laying to the line. Are you being careful not to crowd the line; is there 1/16" or less between top edge of brick and the line?

7. The pilasters, when the wall is completed to given height of ± 1/8", are to be plumb at four outside corner edges to within ± 1/4".

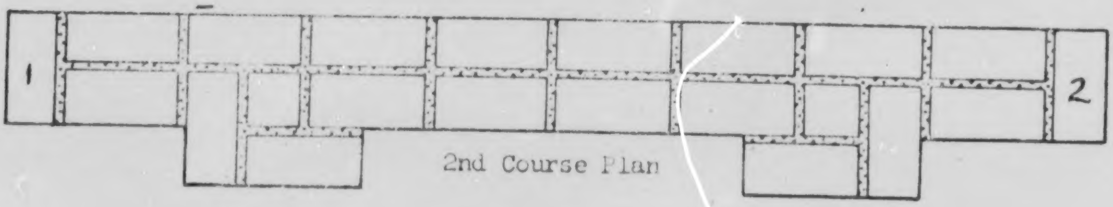
I gottcha! You never should have promised if you weren't gonna do it.

8" METAL TIED WALL WITH TWO 4" X 12" PILASTERS

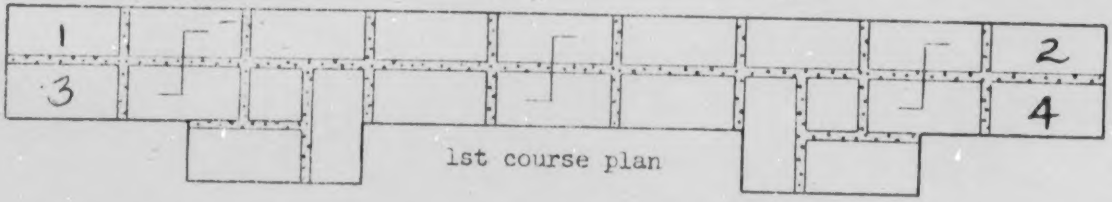
Figure 4



Elevation



2nd Course Plan



1st course plan

UNIT VII: CONSTRUCTION OF BRICK WALL USING APPROPRIATE PATTERN BOND

TASK PACKAGE #6: AN 8" INTERSECTING STRETCHER WALL

PREREQUISITES: UNIT VII, TASK PACKAGES 1-5

RATIONALE:

Many of the buildings that you will construct have to be partitioned off; therefore, it is necessary to know how to join a partition to an outside wall. In this task package you will learn how to construct an intersecting wall. In the construction of an apartment building this type of construction, the intersecting wall, is frequently used. Upon completion of this task package you will have successfully completed another milestone along the journey to becoming a skilled brick mason.

OBJECTIVE:

Upon completion of this task package you will be able to lay up an 8" intersecting stretcher wall between established leads maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. all brick in main wall laid to the line.

d. all brick in the short intersecting wall squared, leveled, and plumbed.

e. install metal ties in mortar.

Your performance will be evaluated in accordance to the instructor's check list.

LEARNING ACTIVITY:

1. At the resource center view sound-slide package #BM-VII-2.
2. Review Unit VII, Task Packages 1-5.
3. View figure 5 in this task package and observe the brick placement of the 2nd course at the intersecting point of the short wall to the main wall. Why do you think they are placed in this manner - as opposed to only abutting the main wall? Is it necessary to tie an intersecting wall into

LEARNING ACTIVITY (cont'd):

another wall? If not tied in, what could happen to a wall at the intersecting point? Write your answers on a sheet of paper and let the instructor see them.

4. If you have any questions, before starting the Learning Practice, consult with your instructor and then complete the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 6' spacing rule
3. Level
4. Brick hammer
5. Mason's line
6. Line blocks or pins
7. "Carpenter's" square
8. Mortar board

1. Check with your instructor for the height of the wall.
2. Determine the brick spacing and use the correct course number in laying up the given wall height. It is necessary that the spacing mark coincide with the top edge of all brick courses.
3. Embed metal wall ties in proper locations in the wall.
4. Using figure 5, page 5, lay out the first course plan, dry positioning of the brick.
5. Lay up the first course of brick on mortar:
   a. set line at established corner leads.

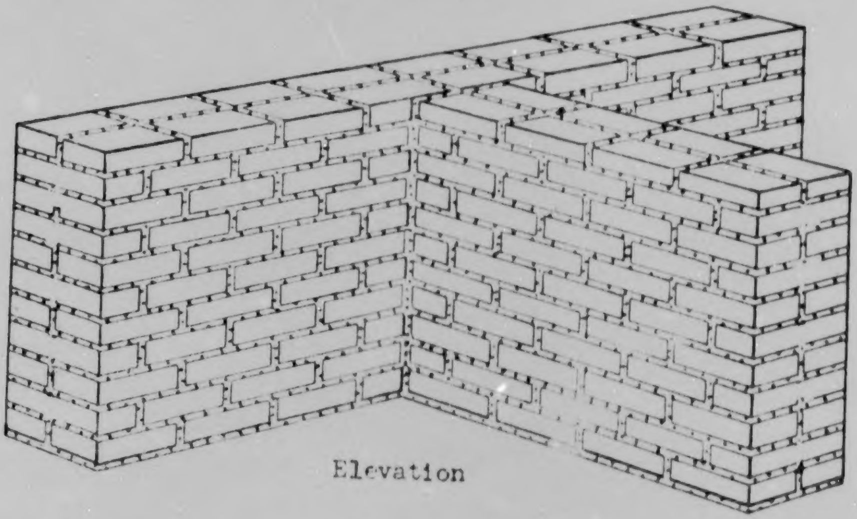
LEARNING PRACTICE (cont'd):

  b. lay up bricks #1 and #2.
  c. lay up brick to the line.
  d. lay up bricks #3 and #4.
  e. lay up brick to the line.
  f. lay up brick #5 and #6.
  g. lay up brick in short wall leveling from brick #5 and #6.
  h. check both sides of the short wall with the square ± 1/16" from the main wall.

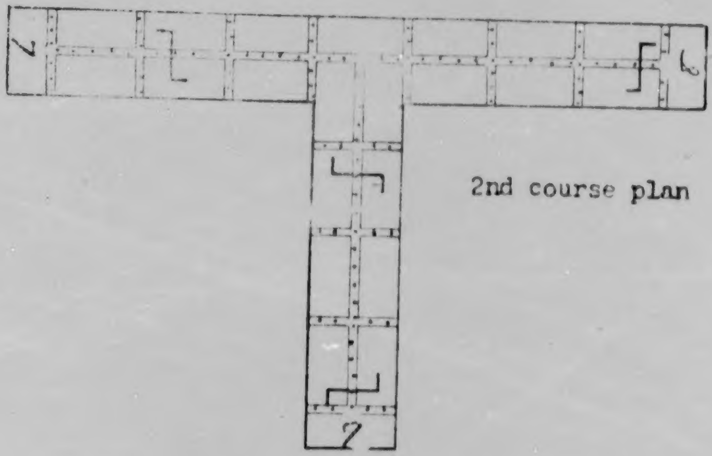
6. Adjust line to lead for next course of brick.
7. Lay up the second course of brick on mortar:
   a. lay up bricks #7 and #8.
   b. lay up brick to the line on both sides of the wall.
   c. lay up brick #9.
   d. lay up brick leveling from #9 to the longer wall.
8. Repeat the 1st and 2nd course procedures on the remaining courses to the given wall heights ± 1/8". All courses to be level and plumb within ± 1/4".
9. Clean up work area daily and clean, dry and place tools in their proper place.

So you're a non-conformist? Well, do a task package. Not everybody else does.

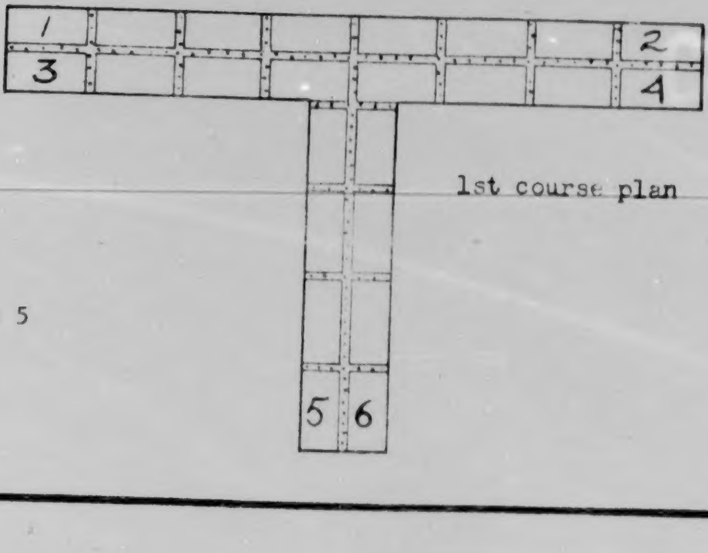
8" INTERSECTING METAL-TIED WALLS



Elevation



2nd course plan



1st course plan

Figure 5

BM-VII-7

UNIT VII: CONSTRUCTION OF BRICK WALL USING APPROPRIATE PATTERN BOND

TASK PACKAGE #7: 8" WALL IN COMMON BOND

PREREQUISITES: UNIT VI-2; UNIT VII 1-6

RATIONALE:

News flash - too many "hogs in the walls" have been discovered in brick structures in Hog Jowl, U.S.A. These "hogs in the walls" could have been eliminated with closer attention to pattern details. The design discussed here, along with other patterns, will serve you well in properly designing walls.

A pattern design very often used in brick masonry is the common bond. In the previous task package an 8" wall was joined together using metal ties; in this task package you will learn how the mere positioning of a brick (header) permits you to structurally bond two or more wythes together. In addition to being functional, the common bond is esthetically pleasing in appearance and is second to the stretcher bond in use. Oftentimes common bond is referred to as American Bond. Being an American, shouldn't you know this?

OBJECTIVE:

Upon the completion of this task package you will be able to lay up an 8" common bonded wall between established leads maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise

b. ± 1/8" for overall height for a given number of courses and wall height

c. all brick laid to a line

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #BM-VII-3 for today's show.
2. Review figure #2 in this task package and observe the brick positions to the 2nd and 8th course plan in relation to the objectives in past task packages. Also note the 3/4 length brick used in the 2nd and 8th courses. Figure the approximate length of the 3/4 length brick and ask your instructor for them in inch lengths.
3. Read Masonry Simplified, Volume I, pages 291, 293, 295, 298 to 300. Observe on page 297, figure 30, the variety of methods

LEARNING ACTIVITY (cont'd):

of corner layout using common bond patterns.

4. If needed for review see Unit VI, 2; Unit VII, 1-6.

5. This completes the Learning Activity; consult your instructor if you have any questions, or go to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 6' spacing rule
3. Brick hammer
4. Mason's line
5. Corner blocks or pins
6. Mortar board

1. Check with your instructor for the height of the wall.
2. Determine the brick spacing and use the correct course number in marking them onto the established leads.
3. Using figure 2 in this task package, lay out the first course dry as shown on the plan, spacing the brick 3/8" to 1/2" apart for location of wall.
4. Lay up the first course of brick by:
    a. Stretch line on to established lead at the correct course spacing.
    b. Bed up bricks #1 and #2 in position.
    c. Lay up the remainder of the brick in the course.

LEARNING PRACTICE (cont'd):

d. Turn line over to other side of the wall established lead and bed up bricks #3 and #4.

e. Lay up the remainder of brick in the wall to the line.

5. Note: On the second course there are four 3/4 length bricks placed on the wall. Approximately how long is a 3/4 length brick?

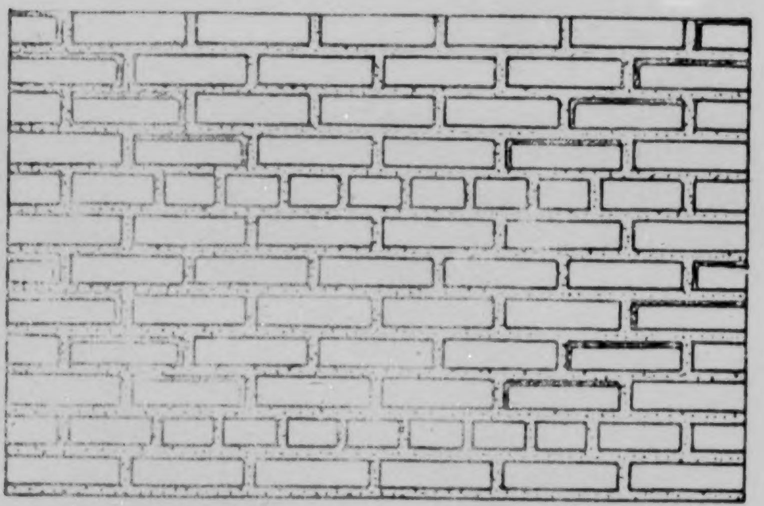
6. The second and eighth courses are the header courses and used in this manner serve to structurally bond the two wythes of wall into one; in previous task packages you structurally bonded a wall by metal ties in the wall. A new experience will be yours when you lay in the header brick in this course. See figure #3 in this task package, and if needed, see your instructor for the proper method of holding and buttering the head joints.

7. The remainder of the courses are constructed just as the 8" stretcher brick wall.

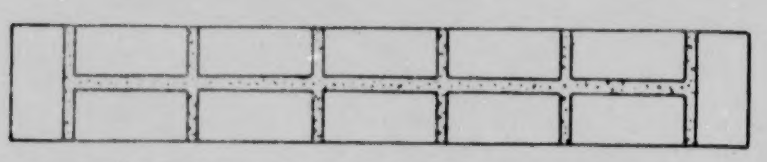
8. Height of the given wall to be ± 1/8". Is that line still getting in your way? The best way to remedy this is to keep on practicing and with perseverance you will overcome. You've gone this far already - and only one more task package in this unit. You're really getting with it!

Figure 2

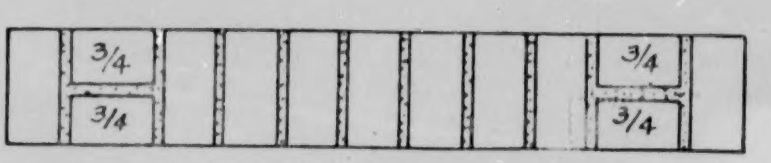
AN 8" WALL IN COMMON BOND



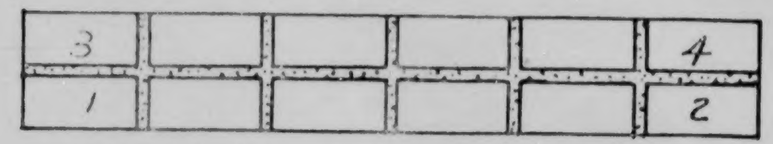
Front Elevation



4th, 6th, 10th and 12th course plan

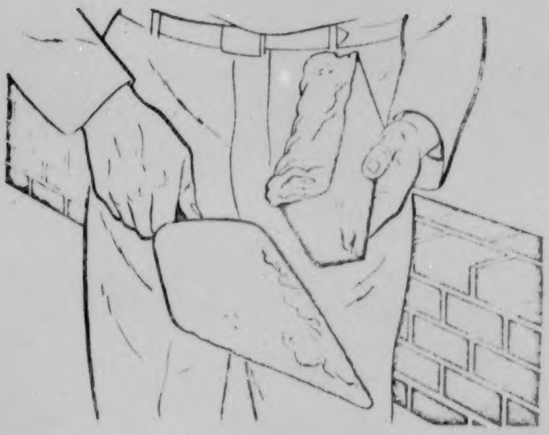


2nd and 8th course plan

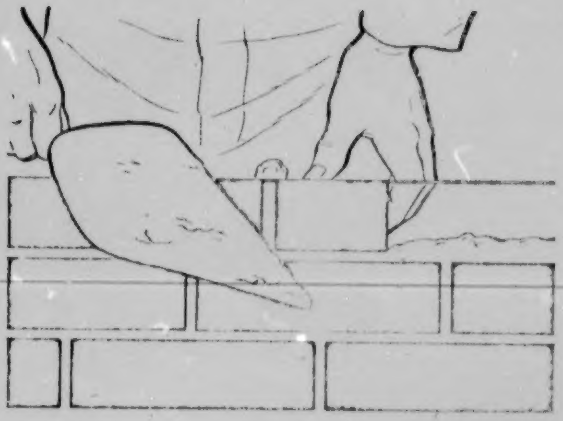


1st, 3rd, 5th, 7th 9th and 11th course plan

BUTTERING HEADER BRICK



Step 1



Step 2

Figure 3

UNIT VII: CONSTRUCTION OF BRICK WALL USING APPROPRIATE PATTERN BOND

TASK PACKAGE #8: 10" CAVITY WALL IN STRETCHER BOND

PREREQUISITES: UNIT VI, TASK PACKAGE 2; UNIT VII, TASK PACKAGES 1 - 6

RATIONALE:

When you're cold, you're cold, and when your're hot, you're hot.

Do you know how you can build a brick wall that will keep the heat in and cold out or vice versa? Well, the solution is simple - take what mother nature has to offer; that is the air which is an insulator and sandwich it between two brick walls. The name of this type structure is called a cavity wall. The cavity between the wythes of brick may be filled with other types of insulation material as well as reinforced grout. Cavity walls also provide the needed space for plumbing and electrical fittings. Now read your Objective and proceed to the Learning Activity.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a 10" cavity wall, using stretcher bond maintaining the following:

a. 3/8" to 1/2" mortar space between each brick lengthwise.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. all brick laid to the line.

d. ± 1/2" for width of wall.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. At the resource center view sound-slide package #BM-VII-4.
2. Read and study Bricklaying Vocational Textbook, pages 20 - 22, sections a, b, c, and d. Observe in section "a" of page 21 the means of structurally bonding the two wythes together. This is the metal tie needed to make the two wythes into one wall. That cavity looks like the open mouth of a hungry alligator.
3. View figure 2 in this task package and look at brick #3, 4 and 5. These are 3/4 length brick to be used for correct layout of the cavity wall.
4. Now that you have completed the Learning Activity, take the tiger by the tail and complete the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 6' spacing rule
3. Level
4. Brick hammer
5. Mason's line
6. Line blocks
7. "Carpenter's" square
8. Mortar board

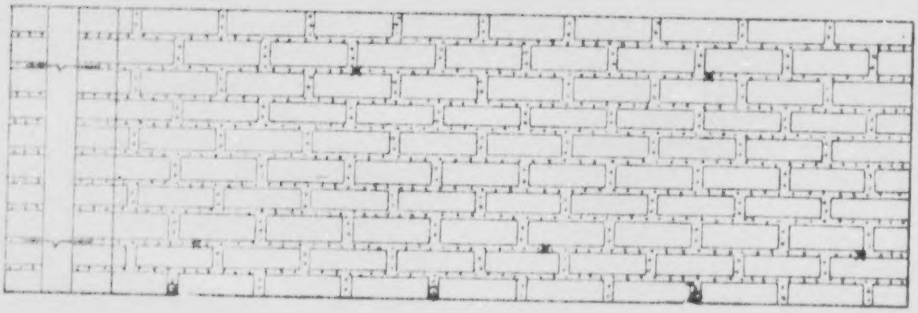
1. Check with your instructor for the height of the wall.
2. Determine the brick spacing and use the correct course number in marking them on to the established leads.
3. Using figure 1 in this task package, lay out the first course dry as shown on the plans, spacing the brick 3/8" to 1/2" apart for location of wall.
4. Stretch line from existing leads located on the first course marking and bed up bricks #1 and #2; lift the remaining brick and set them in mortar to the line; brick #1 is square to the line.
5. Bed brick #6 and lay in the brick between brick #1 and #6 using the level, checking alignment and leveling.
6. Measure 12" from face of courses of position and bed up 3/4 brick #3, #4, and #5. Brick #5 is square to the first course in position; lay in the remaining brick in the first course.
7. Embed wall ties on the second and eighth course as you are laying up the wall to the given height ± 1/8".

LEARNING PRACTICE (cont'd):

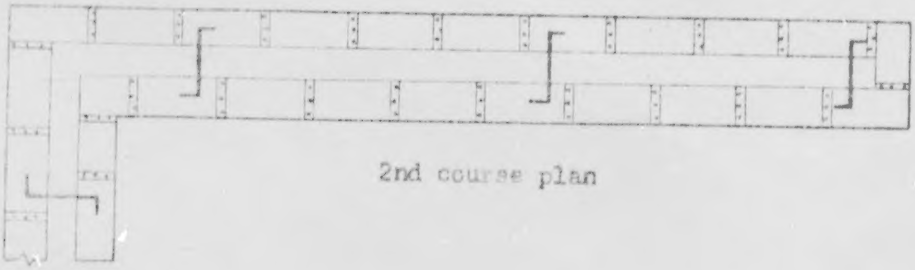
8. Cavity is to be kept free of mortar droppings at all times.
9. Return corner to be kept level and plumb ± 1/4".

There's really nothing to it but to do it. So you thought only dentists worked with cavities!

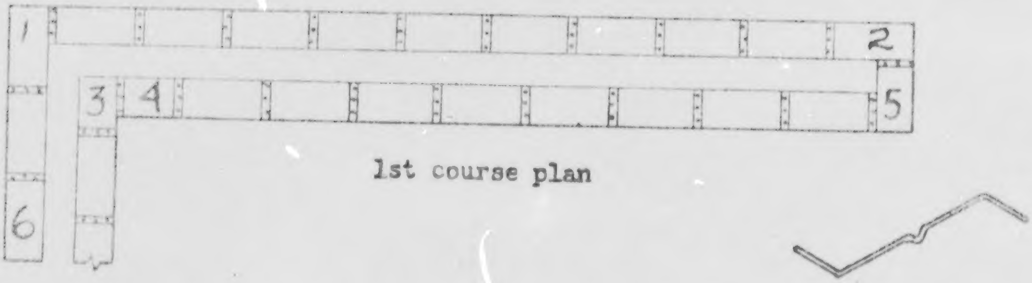
10" CAVITY WALL



ELEVATION



2nd course plan



1st course plan

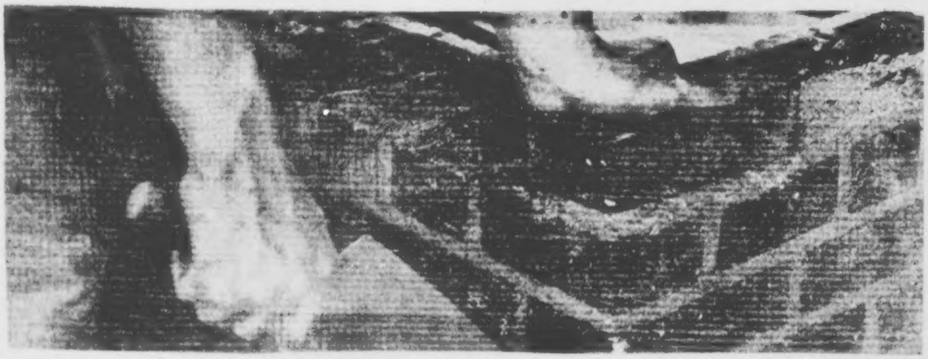
Z Drip-Tie

Figure 1

[illegible] Ties at 16" o.c. vertical and 24" o.c. horizontal staggered

RESEARCH PROJECT

SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330



CLUSTER: MASONRY

COURSE: BRICKLAYING

CE 033 732 (4)

UNIT VIII: BUILDING BLOCK WALLS USING APPROPRIATE PATTERN BOND

PREREQUISITES: UNIT I, TASK PACKAGES 1-3; UNIT III, TASK PACKAGE 1;
UNIT VIII, TASK PACKAGES 1-4

RATIONALE:

In the construction of most commercial building, much of the masonry construction is of concrete block. The foundation, usually below grade line, uses concrete block as the building material with the width of the wall determined by job site conditions. One of the walls in this task package, the 8" stretcher block, is an example of this type of construction. The 4" block walls are used in partitions and in back up material to other masonry units. The stack bond pattern is a decorative wall, so it cannot be used as a load bearing wall. The cavity wall is used in a variety of ways with one being as partition wall with plumbing supply lines, heat ducts, and heavy electrical conduits placed in the cavity.

Continue, now, by reading the General Objective for the unit and the Specific Objectives for each task package. Next, read the Learning Activity, which will indicate to you what you are to do and how to proceed in doing it.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to construct concrete block walls in a variety of bonds and patterns.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Lay up an 8" corner return lead, maintaining the following:
    a. 5/16" to 7/16" mortar space for head joints.
    b. ± 1/8" for overall height for a given number of courses and wall height.
    c. each course leveled ± 1/16".
    d. overall height plumbed ± 1/4".
    e. corner squared ± 1/16".

    Your performance will be evaluated in accordance with the instructor's checklist.

2. Lay up a 4" stretcher block wall, maintaining the following:
    a. 5/16" to 7/16" mortar space between each block lengthwise, hereafter known as the head joint.
    b. ± 1/8" for overall height for a given number of courses and wall height.
    c. each corner leveled ± 1/16".
    d. overall height plumb ± 1/4".

    Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

3. Lay up an 8" stretcher block wall, maintaining the following:
   - a. 5/16" to 7/16" mortar space for head joints.
   - b. ± 1/8" for overall height for a given number of courses and wall height.
   - c. each course leveled ± 1/4".
   - d. overall height plumbed ± 1/4".

   Your performance will be evaluated in accordance with the instructor's checklist.

4. Lay up an 8" stack block wall, maintaining the following:
   - a. 5/16" to 7/16" mortar space for head joints.
   - b. ± 1/8" for overall height for a given number of courses and wall height.
   - c. each course leveled ± 1/16".
   - d. overall height plumbed ± 1/4".

   Your performance will be evaluated in accordance with the instructor's checklist.

5. Lay up a 14" cavity block wall using stretcher bond, maintaining the following:
   - a. 5/16" to 7/16" mortar space for head joint.
   - b. ± 1/8" for overall height for a given number of courses and wall height.
   - c. each course leveled ± 1/16".
   - d. overall height plumbed ± 1/4".

OBJECTIVE (cont'd):

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

It is desirable to begin your work in this unit by completing task package 1, and then proceed with the remainder of the five packages, in order, to the completion of the unit. All of the task packages have a Prerequisite and should be completed in numerical order. In the packages you will be asked to view a sound-slide program, read the assignments, answer questions and construct concrete block walls in a variety of bonds and patterns.

The titles of the packages contained in this unit are:

TASK PACKAGE 1: 8" CORNER RETURN LEAD.

TASK PACKAGE 2: 4" STRETCHER BLOCK WALL.

TASK PACKAGE 3: 8" STRETCHER BLOCK WALL.

TASK PACKAGE 4: 8" STACK BLOCK WALL.

TASK PACKAGE 5: 14" CAVITY BLOCK WALL.

If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT VIII: CONSTRUCTION OF BLOCK WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE #2: 8" CORNER RETURN LEAD

PREREQUISITES: UNIT I, TASK PACKAGES 1, 2, 4; UNIT III, TASK PACKAGE 1

RATIONALE:

Do you want a corner on the market? No? Then how would you like to construct a return corner lead?

In this package you will be able to construct an 8" return corner lead. To accomplish this you will be using the "carpenter's" square and level to assist you in the construction of the wall. Before any concrete or cinder block can be built, it is necessary to construct sections, usually at the extreme end of the wall known as the corner leads. To achieve this objective we will start off this unit by building an 8" return corner lead. The individual that becomes skilled in corner lead building is in greater demand than one who can lay block only to the line.

Now read your Objective and follow the instructions completely through this task package - and don't get cornered!

OBJECTIVE:

Upon completion of this task package you will be able to lay up an 8" corner return lead maintaining the following:

a. 5/16" to 7/16" mortar space for head joints.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. each course leveled ± 1/16".

d. overall height plumbed ± 1/4".

e. corner square ± 1/16".

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Hop on down and view sound-slide package #BM-VIII-4.
2. See figures 1 and 2 in this task package. Observe the bricklayer's body position in regard to the wall location; also the location of his mortar board.
3. Read Masonry Simplified, Volume I, pages 183 through 186. What is the given relation of the corner lead to the completion of the wall? In positioning the block on a bed of mortar, all final adjustments (level, plumb and adjacent) to the block must be made while the mortar is soft and plastic. What happens to the bond if adjustments are made late? Record the answers in

LEARNING ACTIVITY (cont'd):

writing on a sheet of paper and give them to your instructor before starting the Learning Practice.

4. Proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. "Carpenter's" square
3. Level
4. 6' modular spacing rule
5. Brick hammer
6. Mortar board

1. Check with your instructor for the height of the wall; determine the block course spacing to be used in constructing th the block corner lead to the given height. Block are 8" x 8" x 16".
2. Corner lead uses 4 block with the return 3 block lengthwise.
3. Using figures 1 and 2 in the task package, follow the procedures outlined therein:
   a. dry bond layout of corner lead.
   b. spread and furrow bed of mortar onto the deck.
   c. position corner block.
   d. butter head joints (check with the instructor for head joint buttering technique).
   e. position remainder of the block for the first course.
   f. level the block course ± 1/16".
   g. align the block with the level horizontally.

LEARNING PRACTICE (cont'd):

h. check the return corner for square ± 1/16".

i. plumb the face of the block ± 1/16".

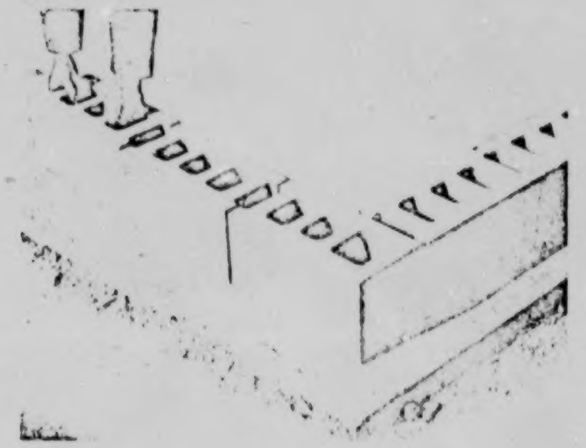
4. Continue building of the corner lead, racking back on tail ends of the courses. Head joints spacings to be 5/16" to 7/16".

5. Overall given height ± 1/8".

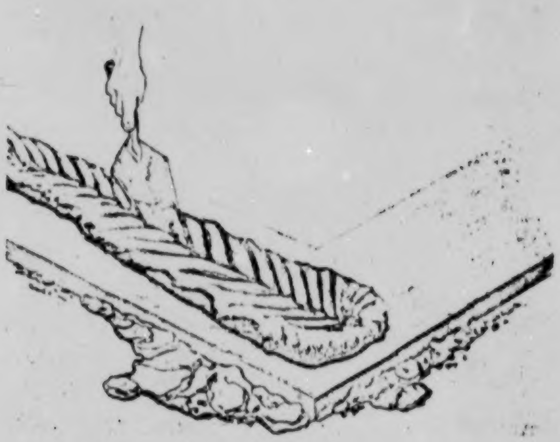
6. Overall height for plumbing corner lead ± 1/4".

The tail end of the return corner lead resembles steps; the acquired skills achieved in learning the masonry crafts will lead up the steps in the preparation for a vocation.

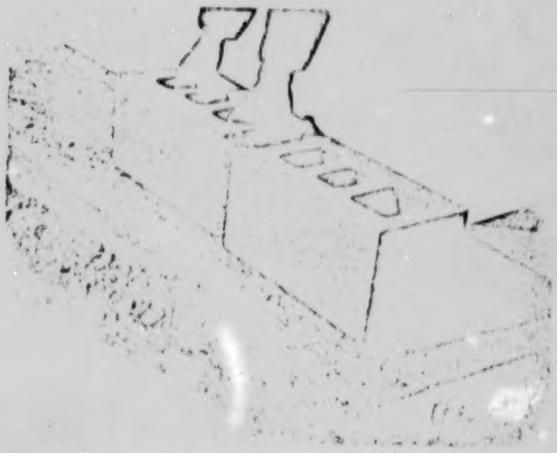
Figure 1



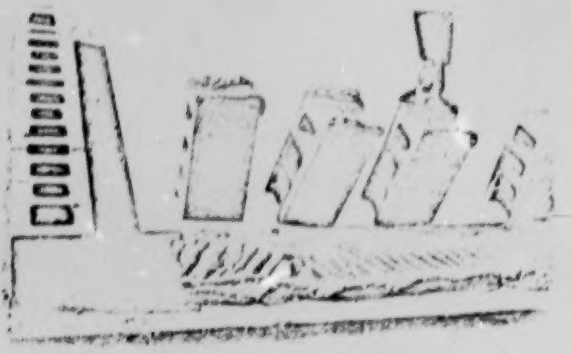
1. DRY LAY OUT OF BLOCK



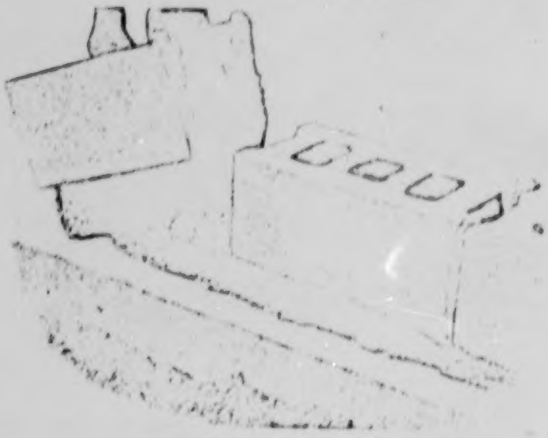
2. SPREAD AND FURROW MORTAR BED



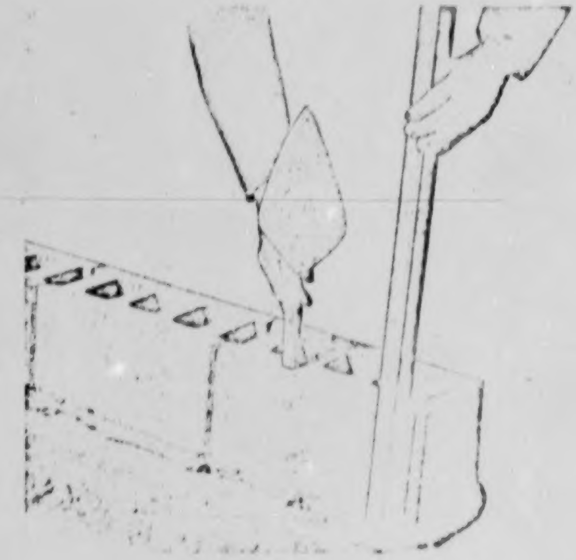
3. POSITION CORNER BLOCK



4. BUTTERED HEAD JOINTS

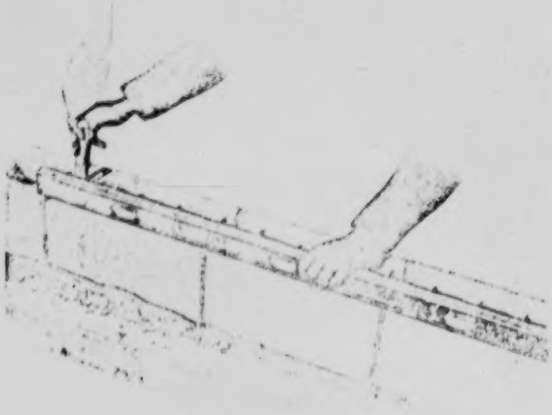


5. POSITION BLOCK

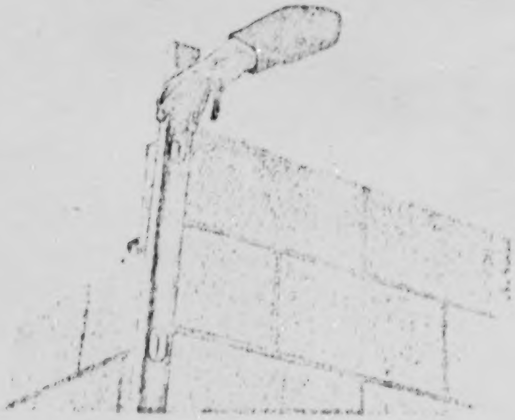


6. PLUMB BLOCK

Figure 2

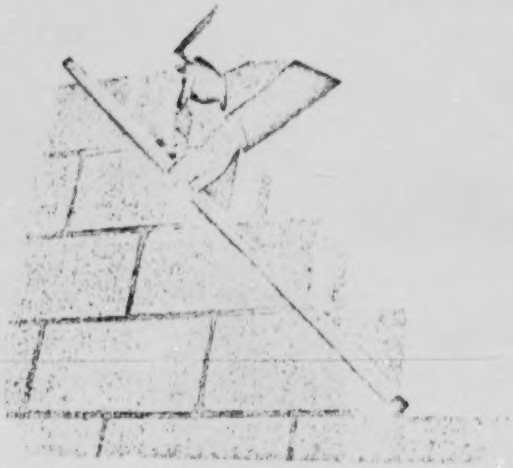


7. LEVEL BLOCK

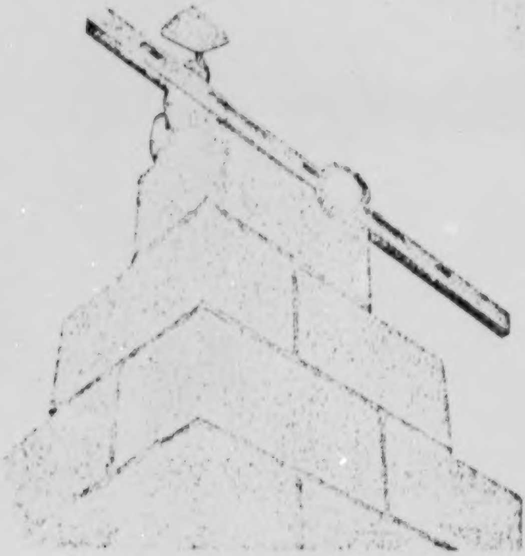


11. PLUMB CORNER

8. ALIGN BLOCK HORIZONTAL



10. ALIGN BLOCK DIAGONAL



9. LEVEL TOP BLOCK ON LEAD

UNIT VIII: CONSTRUCTION OF BLOCK WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE 2: 4" STRETCHER BLOCK WALL

PREREQUISITES: UNIT I, TASK PACKAGES 1, 2, 4; UNIT III, TASK PACKAGE 1;
UNIT VIII, TASK PACKAGE 1

RATIONALE:

Did you know why the giraffe had his neck stretched? So he could see over the stretcher brick walls you will build. And the 4" stretcher brick wall discussed in this task package is a very useful design for the mason. Learn it well and keep the giraffe's neck stretched.

The brick mason, in working with the different materials available, will use the 4" stretcher concrete and cinder block in the construction of masonry walls. It is principally used in non-load bearing partition walls, veneering walls, and as a back-up material on many composite walls. You will find in the construction of this 4" block wall that you will complete the construction of the given wall in much less time than a comparable brick wall, due to the size of the comparable masonry units. One of the important facts about building a 4" block wall is the ability to plan your lay-out so the block will properly fit with the desired dimension. This task package gives you the steps for constructing a 4" block wall, but the rest is up to you. Go get'em, Tiger!

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a 4" stretcher block wall maintaining the following:

a. 5/16" to 7/16" mortar space between each block lengthwise, hereafter known as the header joint.

b. ±1/8" for overall height for a given number of courses and wall height.

c. each course leveled ±1/16".

d. overall height plumbed ±1/4".

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Sound-slide package #BM-VIII-2 is today's feature.
2. Read Masonry Simplified, Volume I, pages 156-159, the section Block Planning. Discuss this section with a fellow student and explain to him how you would plan a block lay-out for a wall.
3. View figure 1 in this task package observing the placement of blocks on the first course plan and the staggered head joints of the elevation view.
4. If still uncertain as to the procedure, check with your

LEARNING ACTIVITY (cont'd):

instructor.

5. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. 6' modular spacing rule
4. Brick hammer
5. Mortar board

1. Check with your instructor for the height of the wall and the blocks to be used.

2. Determine the block course spacing and use the correct course spacing in laying up the given wall height. It is necessary that the spacing marks coincide with the top edge of all block courses.

3. Observe one of your blocks; notice one of the beds is thicker than the other; select and position the thicker bed of the block to be on top when laying in the wall.

   a. providing a better holding power with the hands.

   b. providing a larger bedding area.

4. Using figure 2 on this task package, dry bond block, using 4" x 8" x 16" block to check for layout, using 4 stretcher blocks in the length of the wall.

LEARNING PRACTICE (cont'd):

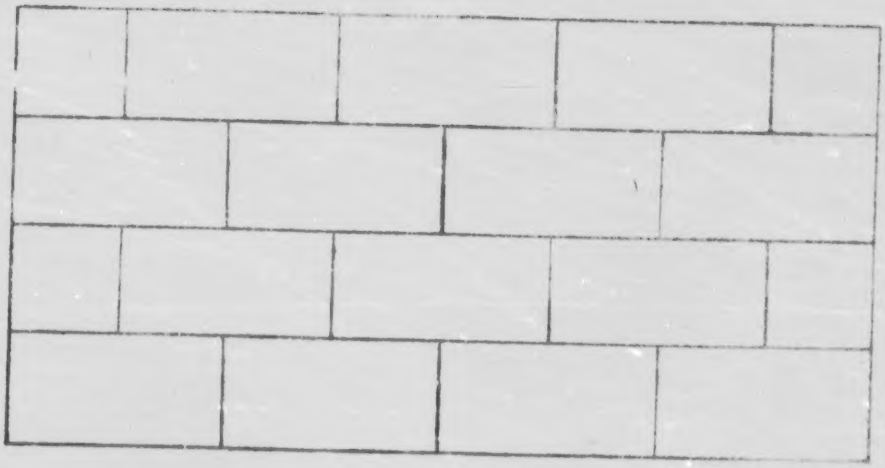
5. Remove the two end blocks and bed up in mortar.
   a. Level the first blocks and then, using it as the guide, level the second and subsequent blocks in the course.
   b. Check the face of the end blocks for plumb and align the remaining blocks in the course to end blocks.
6. For the second course acquire two half blocks, from the instructor, laying them up on opposite ends of the wall, repeating the Objective previously stated.
7. Fill the remaining section of the wall, alternately using proceeding directions.
8. Courses are to be leveled ± 1/16".
9. Overall height plumbed ±1/4".
10. Overall height of wall ±1/8".
11. Clean up your work area; then clean and dry tools, placing them into the tool crib.

Now that you have completed your first block wall, was it as easy as laying up a similiar brick wall? It probably wasn't, but with more practice the skills will develop. With your determination these types of walls will become easier to construct.

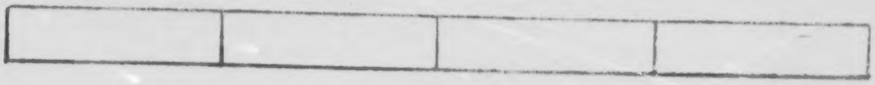
Success in life is largely determined by how hard we try. Rest awhile. Hey, let's try another task package.

4" STRETCHER BLOCK WALL

Figure 1



ELEVATION VIEW



1ST COURSE PLAN

UNIT VIII: CONSTRUCTION OF BLOCK WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE 3: 8" STRETCHER BLOCK WALL

PREREQUISITES: UNIT VIII, TASK PACKAGES 1 AND 2.

RATIONALE:

Have you ever thought concretely about the value of cinder block in modern construction? Well, why not put this block into your thinking and be concrete with it?

The 8" concrete and cinder block wall is used extensively in the construction of commercial and residential buildings. It is one of the most economical and durable of the wall finishes. Blocks can be used successfully for a wide variety of construction purposes, including buildings such as homes, apartments, schools, churches, industrial plants, offices, and all types of farm structures. In your construction of the 8" stretcher wall, good construction demands either that joints be staggered or that adequate reinforcement be used. Good appearance demands that the blocks be employed uniformly in all courses.

Through the Learning Activity and Learning Practice in this task package, besides being introduced to the materials, you will become more acquainted with using the level as a checking instrument.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up an 8" stretcher block wall maintaining the following:

a. 5/16" to 7/16" mortar space for head joints.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. each course leveled ± 1/16".

d. overall height plumbed ± 1/4".

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-VIII-2, a good show!
2. Read and study Masonry Simplified, Volume 1, pages 181 through 186, the section Laying Concrete Block Walls. Observe figures 44 and 45 on page 182. What tool is the brick mason using in his left hand and what procedure is he accomplishing with the tool? — Write the answers on a sheet of paper and hand them to the instructor before starting your Learning Practice.
3. View figure 1 in this task package for the first course plan layout and elevation view.

LEARNING ACTIVITY (cont'd):

4. This completes your Learning Activity; consult with your instructor if you are unsure of the objectives and then proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel	4. Brick hammer
2. Level	5. Mortar board
3. 6" modular spacing rule	

1. Check with your instructor for the height of the wall; determine the block courses spacing to be used in laying up the block wall to the given height.
2. Following the procedures outlined on pages 181 through 185 in Masonry Simplified, Volume I, lay out dry the block wall, four stretcher blocks lengthwise. View figure 1 in this task package.
3. Alternate courses will use a half block at both ends of the wall to create the stretcher-bond pattern.
4. Head joints for spacing will be 5/16" to 7/16" wide.
5. Each course leveled ± 1/16".
6. Overall height plumbed ± 1/4".
7. Overall given height of wall ± 1/8".

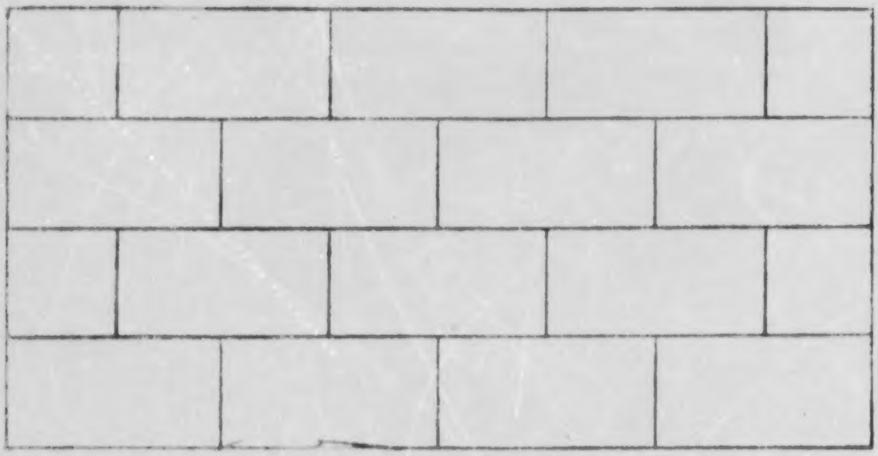
LEARNING PRACTICE (cont'd):

8. By this time you have probably recognized that the 8" block are easier to control than the 4" block, because of the greater width of the block. When you are working on a paying job you will also lay up 12" block, using 12" block, and will find this does not hold true. The larger sizes only slightly increase in weight of the block. By that time, your body muscles will be so tough that the little extra weight of the larger block will be of no concern.
9. Have your instructor check your wall upon completion and then proceed to the next task package.

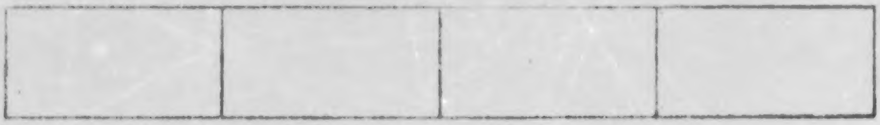
Congratulations! Brick masons always make a pile.

8" STRETCHER BLOCK WALL

Figure 1



ELEVATION VIEW



1ST COURSE PLAN

UNIT VIII: CONSTRUCTION OF BLOCK WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE #4: 8" STACK BLOCK WALL

PREREQUISITES: UNIT VIII, TASK PACKAGES 1, 2, and 3

RATIONALE:

Do you like variety? Most people do. Well, masonry provides you with different varieties of patterns. Just consider the contents of this task package.

So you say that you're tired of using the stretcher bond pattern. Well, here is an opportunity to remedy that situation by building a block wall with a stack block pattern. You have noted, however, in Unit IV, Task Package 2, that while a stack block pattern may be pleasing in appearance, it lacks the basic structural support to stand by itself.

In previous task packages on block wall construction, you built the walls with the head joints staggered to give the wall structural support.

You will find that all vertical and horizontal joints of the 8" stack block wall are in a continuous, unbroken line. The key to the success of this wall is keeping the block units directly above each other in perfect alignment, and maintaining a uniform joint. This package can be a challenge to the skill you have already developed. So good luck, and complete the Learning Activity and

RATIONALE (cont'd):

Learning Practice after reading and studying the Objective.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up an 8" stack block wall maintaining the following:

a. 5/16" to 7/16" mortar space for head joint.

b. ±1/8" for overall height for a given number of courses and wall height.

c. each course leveled ±1/16".

d. overall height plumbed ±1/4".

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #BM-VIII-2 for today's attraction.
2. View figure 1 of this task package. Compare the contrasting elevation view of this package with the previous task packages on block walls. Notice the arrangement of the blocks as well as those of the mortar joints. Looks simple, so try it; you'll like it.

LEARNING ACTIVITY (cont'd):

3. While driving by the Mobile Home Sales Display Center on Bragg Street, observe the planter box beneath the sign. What material and pattern bond were used in its construction? Discuss the answers with your instructor.

4. Having completed the Learning Activity, proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. 6" modular spacing rule
4. Brick hammer
5. Mortar board

1. Check with your instructor for the height of the wall; determine the block course spacing to be used in laying up the block wall to the given height.

2. Dry bond 8" x 8" x 16" block to check for layout, using 4 stretcher blocks length wise.

3. Lay up the first course in mortar, leveling, plumbing and aligning the block.

4. On the second and remaining courses the blocks are positioned directly above the first course layout, making all head joints and block vertically aligned.

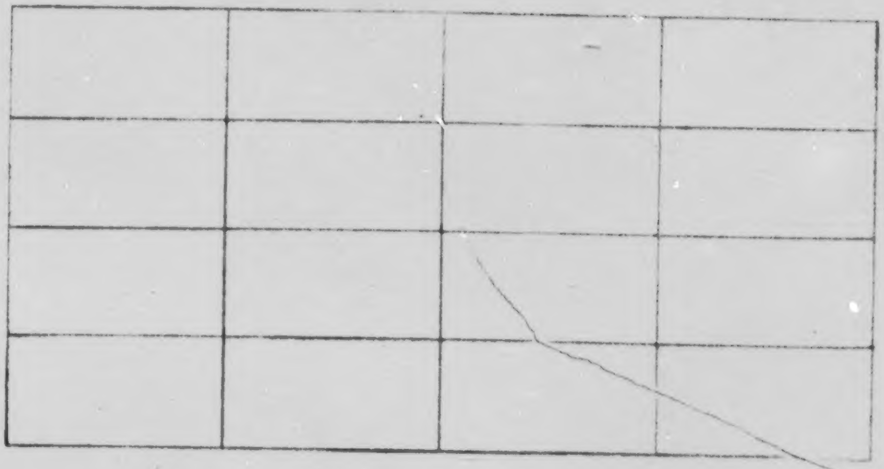
LEARNING PRACTICE (cont'd):

5. Spacing for head joint 5/16" to 7/16".
6. Each course leveled ±1/16".
7. Overall height plumbed ±1/4".
8. Over a given height of wall ±1/8".
9. When you are satisfied that your Objective has been met, check with your instructor and, upon his satisfaction, take down your wall and proceed to another task package.

Without brick masons, we would have never been able to build the Empire State Building.

8" STACK BOND WALL

Figure 1



ELEVATION VIEW

1ST COURSE PLAN

UNIT VIII: CONSTRUCTION OF BLOCK WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE #5: 14" CAVITY BLOCK WALL

PREREQUISITES: UNIT VIII, TASK PACKAGES 1 - 4

RATIONALE:

Believe it or not, cavities sometimes serve really useful purposes. Of course, we're not speaking of dental cavities but those cavity walls which you need to learn how to build in masonry.

A cavity wall is a form of a masonry wall consisting of two parallel wythes of masonry separated by a continuous air space, usually about 2" wide. One of the advantages of cavity wall construction is that the air space acts to prevent rain or moisture that has seeped through the outer wythe from penetrating the inner wythe. The cavity also provides additional insulation as a result of the air space. An improvement of over 25% in insulating value was found for unventilated cavity walls compared with solid walls of the same materials. Cavity walls when properly built will support approximately the same load as an 8" solid brick wall. As you construct this wall you can tell your friends you have a cavity and Crest did not have a thing to do with it.

OBJECTIVE:

Upon the completion of this task package you will be able to: lay up a 14" cavity block wall using stretcher bond maintaining the following:

a. 5/16" to 7/16" mortar space for head joints.
b. ± 1/8" for overall heights for a given number of courses and wall height.
c. each course leveled ± 1/16".
d. overall height plumbed ± 1/4".

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Today's outstanding feature is sound-slide package #BM-VIII-3.
2. Read Masonry Simplified, Volume I, pages 177 through 179, the section Cavity Walls. Observe the types of non-corroding wall ties recommended for use in this type of wall construction. See figure 37, page 179, for the basic arrangement of a cavity wall.
3. View figure 5 in this task package, noting the two distinct sizes (widths) of the block in the placement of the block on first course plan.
4. If you have any question before starting the Learning Practice, consult with your instructor.

LEARNING PRACTICE:

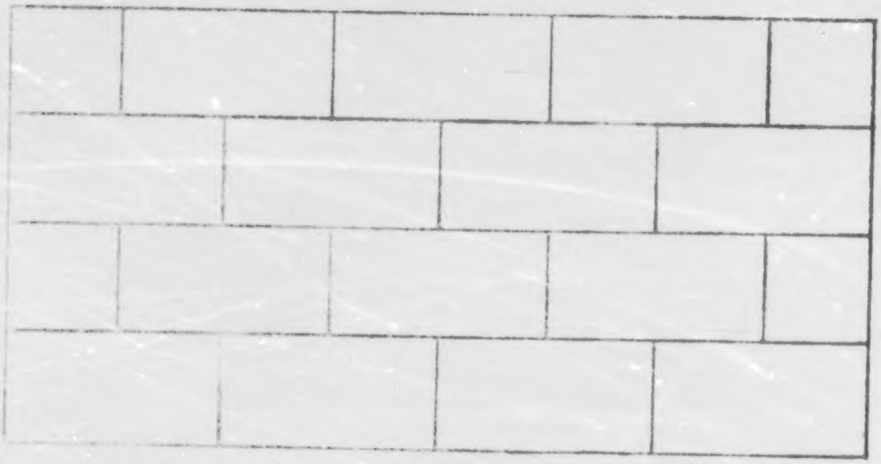
Tools and Equipment

1. Trowel
2. Level
3. 6' modular spacing rule
4. "Carpenter's" square
5. Brick hammer
6. Mortar board

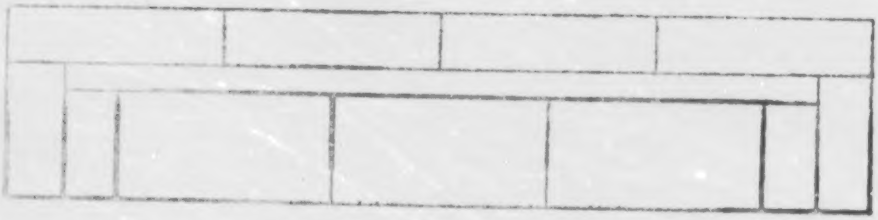
1. Check with your instructor for the height of the wall and the blocks to be used; determine the block course spacing and use the correct course spacing in laying up the given wall height.
2. Using Figure 5 in this task package dry bond block wall, using 4" x 8" x 16" and 8" x 8" x 16" blocks.
3. Construct the cavity wall using the Objectives learned in the task packages 1 through 4 in Unit VIII.
4. Block cavity walls fall into the category as a brick cavity wall, except for the more economical cost of the block wall in comparison to the brick wall.
5. You barrelled yourself right through another task package.

14" CAVITY BLOCK WALL

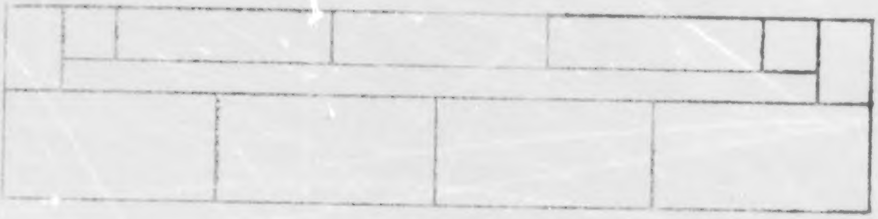
Figure 5



ELEVATION VIEW



2ND COURSE PLAN



1ST COURSE PLAN

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: MASONRY
COURSE: BRICKLAYING

[illegible] 77- CONSTRUCTION OF COMPOSITE MASONRY WALL [illegible]
[illegible]

[illegible] TASK [illegible] 1-8 [illegible]
[illegible] 1-8

In this task, [illegible] composite [illegible] and [illegible] combination of masonry material that [illegible] construction of the [illegible], [illegible] school property. The 8" [illegible] and 4" [illegible] is usually used on [illegible] two [illegible] 12" [illegible] on [illegible] composite wall [illegible] the hazards of heat, sound and water penetration [illegible] the wall. Now continue by reading the General Objective [illegible] this unit [illegible] [illegible] that you are [illegible].

OBJECTIVES:

General:

Upon completion of this unit [illegible] be able to construct a variety [illegible] of block [illegible] plans and specifications.

Specific:

Upon completion of the [illegible] for this unit, you will be able to:

1. Lay up an 8" stretch [illegible], maintaining the following:
   a. 5/16" to 7/16" mortar space for head joints [illegible] and block.
   b. ± 1/8" for overall height for [illegible] and wall height.
   c. each course leveled ± 1/16".
   d. overall height plumbed ± 1/4".
   e. position metal wall ties.

Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

2. Lay up a 12" stretcher bond wall using 4" brick and 8" block, maintaining the following:
   a. 5/16" to 7/16" mortar space for head joints for brick and block.
   b. ± 1/4" for overall height for a given number of courses and wall height.
   c. each course leveled ± 1/16".
   d. overall height plumbed ± 1/4".
   e. install metal ties in mortar.

   Your performance will be evaluated in accordance with the instructor's checklist.

3. Lay up a 12" common bond wall using 4" brick and 8" header block (2nd and 4th block courses), maintaining the following:
   a. 5/16" to 7/16" mortar space for head joints for brick and block.
   b. ± 1/4" for overall height for a given number of courses and wall height.
   c. each course leveled ± 1/16".
   d. overall height plumbed ± 1/4".

   Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

4. Lay up a 10" stretcher bond cavity wall, using 4" brick and 4" block, maintaining the following:

   a. 5/16" to 7/16" mortar space for head joints for brick and block.

   b. ± 1/8" for overall height for a given number of courses and wall height.

   c. each course leveled ± 1/16".

   d. overall height plumbed ± 1/4".

   Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

In this unit you will be able to begin on any one of the four task packages you desire; although they have prerequisites, it is not necessary to do them in numerical order. Ther is a different degree of difficulty in each so you will receive skills that are not dependent on the others. In the packages you will be asked to view today's attractions on a sound-slide program, read the assignments, answer questions and construct a variety of composite walls using stretcher and common bonds. The number and the names of the task packages included in this unit are as follows:

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 1: 8" STRETCHER WALL USING 4" BRICK AND 4" BLOCK

TASK PACKAGE 2: 12" STRETCHER WALL USING 4" BRICK AND 8" BLOCK

TASK PACKAGE 3: 12" COMMON BOND WALL USING 4" BRICK AND 8" HEADER BLOCK.

TASK PACKAGE 4: 10" STRETCHER CAVITY WALL USING 4" BRICK AND 4" BLOCK

Having completed the Learning Activity, begin your work as outlined above. You will be tested on the unit, after completing the four (4) task packages.

UNIT IX: CONSTRUCTION OF COMPOSITE MASONRY WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE 1: 8" STRETCHER WALL USING 4" BRICK AND 4" BLOCK

PREREQUISITES: UNIT VII TASK PACKAGES 1-7; UNIT VIII, TASK PACKAGES 1-4

RATIONALE:

Go mod, young man. Be a modern mason. Use modular brick and make things easier on yourself.

Various combinations of brick and concrete or cinder block are often used in the construction of walls for residences and commercial buildings. Such walls have an advantage in that they are generally built faster than solid brick walls.

You have in the previous two units learned to work with individual brick and block walls. In this task package the objectives will be to use brick and block together in a composite wall. In most instances three courses of brick will lay up to one course in height of block, spacing the mortar joints correctly. This system of using the materials together is known as modular. Modular means that two or more building materials will fit together with very little cutting at the job site.

RATIONALE (cont'd):

Prior to the early 1900's masonry walls were constructed of solid walls 4 wythes thick or approximately 16". It took much time in constructing such a wall, so the development of the first brick and tile composite walls and, in the last 20 to 25 years, the brick and block composite wall, helped speed up things for the mason.

OBJECTIVE:

Upon completion of this task package you will be able to lay up an 8" stretcher wall using 4" brick and 4" block maintaining the following:

a. 5/16" to 7/16" mortar space for head joints for brick and block.

b. ± 1/8" for overall heights for a given number of courses and wall height.

c. each course leveled to ± 1/16".

d. overall height plumbed ± 1/4".

e. position metal wall ties.

Your performance will be evaluated in accordance with your instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package BM-IX-I for today's attraction.
2. Take a look at figure 1 in this task package. Observe how the width of the wall remains parallel from the base to the full height. That's the way railroad tracks run in parallel. It is essential that both the brick and block wythes remain plumb ± 1/4". Something else you notice is the corresponding brick modular to the block.
3. If uncertain as to the procedure, check with your instructor.
4. This completes the Learning Activity; keeping the objectives clearly in mind, proceed on to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. "Carpenter's" square
4. Mortar board
5. 6' modular spacing rule
6. Brick hammer
7. Standard brick
8. 4" block

1. Check with your instructor for the height of the wall; determine the brick and block spacing to use the correct course number to check the height as the wall is being built.
2. The length of the 8" composite wall will be determined by four stretcher block, using proper head joint spacing 5/16" to 7/16".

LEARNING PRACTICE (cont'd):

The brick wythe will correspond to the length of the four blocks. Brick and block ends to square with each other.

3. You will use the 6' modular spacing rule for checking the height of brick and block courses. Observing on your rule, the 4" block will lay up on the #2 scale, 4" standard brick to the #6 scale. Three courses of brick on the #6 scale will lay up to one course of block (#2 scale) in height when properly laid to the course numbers on the spacing rule.
4. Employing figure #1 use the first course plan layout to position brick and block.
5. Lay up 3 courses of brick to required height, then, using the block as back up material, back up the brick with 4" block, keeping the top of brick and top of block level with one another.
6. Position metal wall ties, brick to block on top of this course, using three ties properly spaced.
7. Now lay up 6 courses of brick to correct course number, then back up with 2 courses of block to an even height.
8. Position 3 wall ties on top of the third block course.
9. Repeat laying up brick and block, in proper sequence to the given height of the wall ± 1/4".

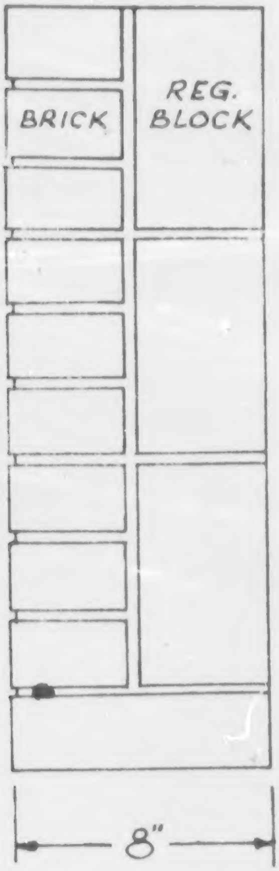
LEARNING PRACTICE (cont'd):

10. All courses are to be level ± 1/16".
11. The overall given height plumb ± 1/4".
12. Whoa there! That wall is not a horse; it doesn't need to be straddled to build it. Hold your proper stance of building a wall in relation to material and wall position.

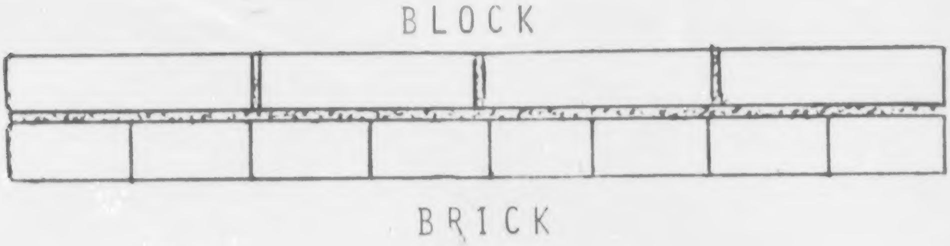
Some people come up against a brick wall and don't know where to go from there, but you are in a good position of being up against a brick wall, and the experience will enable you to gain the better things of life.

Figure 1

AN 8" STRETCHER BRICK AND BLOCK WALL


BRICK
REG. BLOCK
8"

ELEVATION VIEW


BLOCK
BRICK

1ST COURSE PLAN

UNIT IX: CONSTRUCTION OF COMPOSITE MASONRY WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE #2: 12" STRETCHER WALL USING 4" BRICK AND 8" BLOCK

PREREQUISITES: UNIT VII, TASK PACKAGES 1-8; UNIT VIII, TASK PACKAGES 1-4

RATIONALE:

When you do a heavy task, you may need someone to back you up. The same thing is true with building materials. Often they need backing up, and that's the reason for the back-up wall.

As with the 8" composite wall, the 12" brick and block back-up wall was developed to withstand a great structural load in the wall. It is used where great strength is required. The stretcher 12" composite wall is probably the most widely used of the composite walls. Many of the exterior walls of our schools, churches, offices and buildings of this design are built of 12" brick and block composition. As in the planning for the construction of a building where it is necessary to use a 12" wall, construction of that wall must be carried out as carefully as the planning, following definite building codes, building practices and quality workmanship. This is where you are going to be able to contribute your learned skills to a growing and prosperous community. With the skills gained from these objectives, you will become one of the greatly needed and respected brick masons in your community.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a 12" stretcher wall using 4" brick and 8" block maintaining the following:

a. 3/16" to 7/16" mortar space for head joints for brick and block.

b. ±1/8" for overall heights for a given number of courses and wall height.

c. each course leveled ±1/16".

d. overall height plumbed ±1/4".

e. position metal wall ties.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. At the resource center view sound-slide package #BM-IX-2.
2. Observe figure 1 in this task package. The courses of block are laid up to #2 scale, on the modular spacing rule. What course spacing number must be used for the standard brick? Where is the beginning position for setting the zero end of the spacing rule placed? Why is it sometimes necessary to use a 12" composite wall as opposed to an 8" composite wall? Record your

LEARNING ACTIVITY (cont'd):

answers in writing on a sheet of paper, save these answers, and discuss them with a classmate who is working at your speed. Speed only counts after you are hired onto a job; now we are mainly concerned with quality.

3. After you have studied the drawings in figure 1 and have it clear in your mind, proceed on to the Learning Practice, keeping the Objective in mind.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. "Carpenter's" square
4. Brick hammer
5. 6' modular spacing rule
6. Mortar board
7. Standard brick
8. 8" block

1. Check with your instructor for the height of the wall; determine the course spacing scales needed for the brick and block.
2. Using figure 1 in this task package, position the brick and block as presented on the first course plan. Head joints 5/16" to 7/16".
3. Lay up the first 3 courses of brick and back up with one course of 8" block.
4. Properly position 3 metal wall ties on top of this course (brick to block).

LEARNING PRACTICE (cont'd):

5. Lay up 6 courses of brick and back up with 2 courses of block.

   Hold it! That top course of brick is lower than the block; you need to do something with those last 2 courses of block or your last courses of brick.

6. Position correctly 3 metal ties on top of the third block course.

7. Repeat laying up brick and block in proper sequence to the given wall height ±1/8".

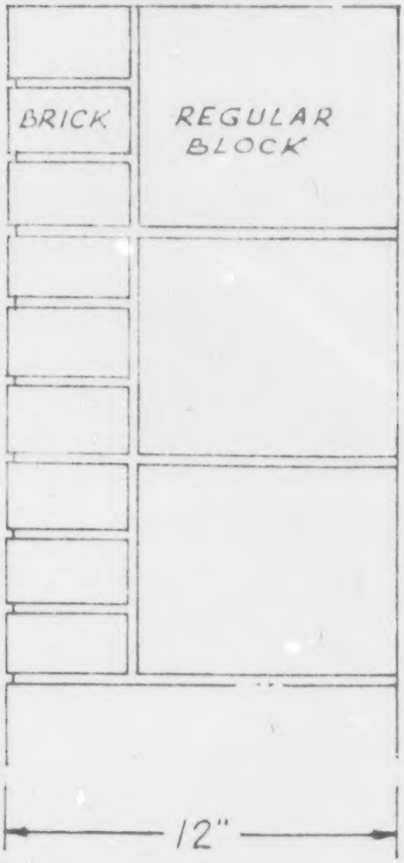
8. All courses to be level ±1/16".

9. Overall given wall height to be plumb ±1/4".

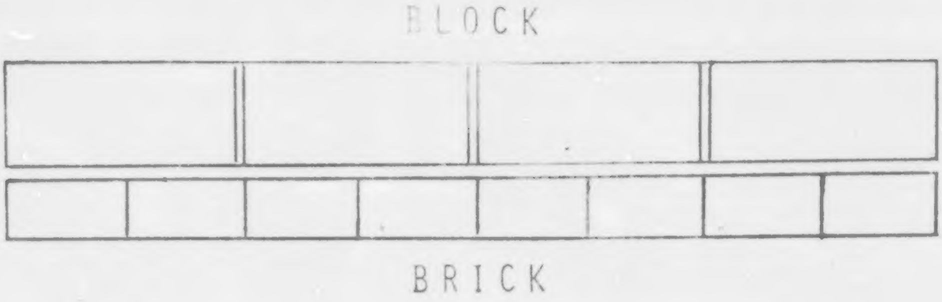
   How do you think the owl got so wise? He did a lot of task packages.

Figure 1

A 12" STRETCHER BRICK AND BLOCK WALL


BRICK
REGULAR BLOCK
12"

ELEVATION VIEW


BLOCK
BRICK

1ST COURSE PLAN

BM-IX-3

UNIT IX: CONSTRUCTION OF COMPOSITE MASONRY WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE #3: 12" COMMON BOND WALL USING 4" BRICK AND 8" HEADER BLOCK

PREREQUISITES: UNIT VII, TASK PACKAGES 1-7; UNIT VIII, TASK PACKAGES 1-4

RATIONALE:

The factors which govern the strength of masonry walls have been determined through years by scientific study and research. One of the factors involved the development of the header block unit that enabled the brick mason to construct a common bond 12" brick and block wall. This wall has the exterior appearance of a solid brick wall and has great structural strength. In the header course used, the brick in header position overlap the header block, making a sound structurally bonded wall.

As stated previously, 12" brick and block common bonded walls can be used in the same manner as like thicknesses of solid brick walls. Again, the key to the success of the 12" wall is the quality of workmanship. So come along and let's build a 12" common bond wall using brick and block. Together we will build a better tomorrow.

OBJECTIVE:

Upon completion of this time program you will be able to lay up a 12" common bond wall [illegible] 4" brick [illegible] header block [illegible] within:

a. 1/16" [illegible]
   [illegible]

b. [illegible]
   wall [illegible]

c. Each course [illegible] 1/8" [illegible]

d. Overall [illegible]

Your self [illegible] will [illegible] instructor's [illegible]

LEARNING A[illegible]

1. View [illegible] BM-IX-3 for [illegible]
2. Read and study Masonry Simplified, Volume I, page 361, section [illegible] The word [illegible] to be substituted by the word "header." Observe [illegible] the structural effect of a brick and block [illegible] wall as compared to a solid brick wall of the same width. Observe in Figure 27, page [illegible], the section of wall [illegible] the brick, stretcher block, and header block. Look at section B in

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LEARNING ACTIVITY (cont'd):

figure 38 on page 349, observing the header brick course interlocking the header block.

3. Apply figure 1 in this task package to your completion of the Learning Practice.

4. After carefully studying figure 1 in this task package, proceed on with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Carpenter's 2" Square
4. Brick hammer
5. 6' modular spacing rule
6. Mortar board
7. Standard brick
8. 8" header block
9. 8" stretcher block

1. Check with your instructor for the height of the wall; determine the course spacing scales needed for the brick and block.

2. Using figure 1 in this task package, position the brick and block as presented on the first course plan. Head joints 5/16" to 7/16".

3. Observe in the elevation section view the header block on the second block course and the header course of brick on the sixth

LEARNING PRACTICE (cont'd):

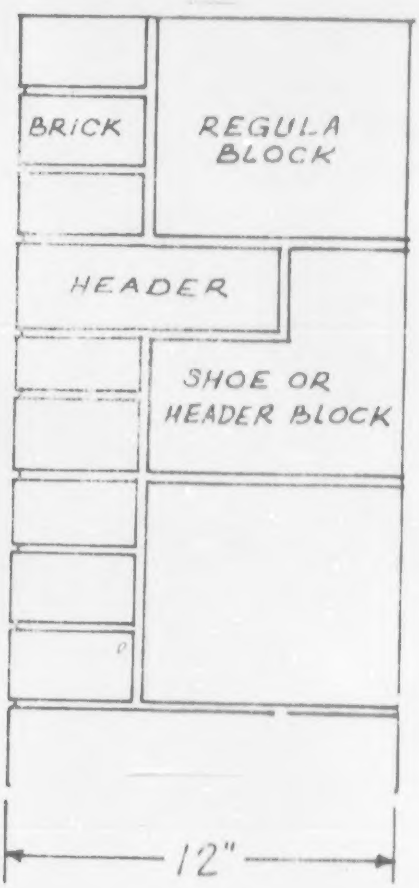
brick course.

4. Lay up the five stretcher courses of brick and back up with first course of stretcher block; second course of header block laid to get proper [illegible] spacing.
5. Lay up the sixth brick course of header brick, being careful that the header brick are correctly positioned to the stretcher brick below.
6. Now carry up the remaining courses to the given wall height ± 1/8".
7. All courses to be level ± 1/16".
8. Overall given height to be plumb ± 1/4".

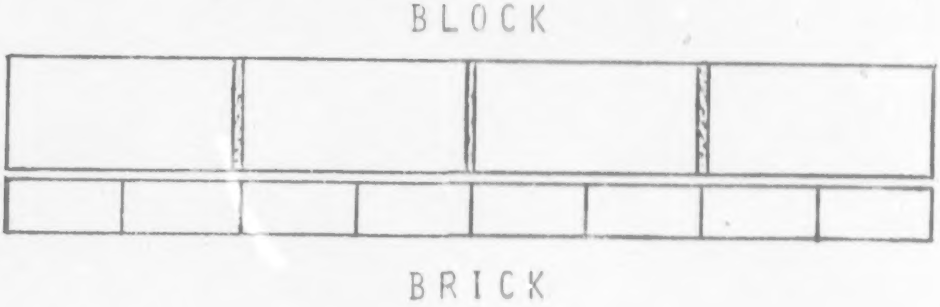
There's nothing else like a Charlie Brown baseball season unless it's doing the Learning Practice in masonry.

Figure 1

A 12" COMMON BOND BRICK AND BLOCK WALL


BRICK
REGULA BLOCK
HEADER
SHOE OR HEADER BLOCK
12"

ELEVATION VIEW


BLOCK
BRICK

1ST COURSE PLAN

UNIT IX: CONSTRUCTION OF COMPOSITE MASONRY WALLS USING APPROPRIATE PATTERN BOND

TASK PACKAGE 24: 10" STRETCHER CAVITY WALL USING 4" BRICK AND 4" BLOCK

PREREQUISITES: UNIT VII, TASK PACKAGE 3; UNIT VIII, TASK PACKAGE 4

RATIONALE:

Look, ma, we've got a cavity! And we built it all by ourselves. It's a desirable cavity which serves many useful purposes.

Cavity walls are intended to produce a water-tight wall which can be plastered direct without the use of furring strips with a material for plaster base. Cavity walls can be used wherever an 8" solid brick wall is used with the confidence that it will be of at least equal strength. The maximum permissible height of a 10" cavity wall is 25 feet or a two-story residence. The cavity in the center of a cavity wall should not be less than 2" or more than 3" in width.

You have learned that cavity wall construction was designed to help with the elimination of moisture penetration into the inner wythe; other plus factors include the heat and cold transmission and the equal strength of a cavity wall to a solid wall. Another interesting tidbit is the fire resistance of cavity walls. Fire tests of cavity walls indicate that the first endurance of these walls ranges from 5 to 7 hours; whereas tests on walls up to 10" solid or composite (other than cavity) revealed first endurance to be approximately 4 hours.

RATIONALE (cont'd):

With all the advantages of the cavity wall, it is only as good as the quality of workmanship put into it. The pride you develop in your work is another key to success.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a 10" stretcher cavity wall, using 4" brick and 4" block, maintaining the following:

a. 5/16" to 7/16" mortar space for head joints for brick and block.

b. ± 1/8" for overall height for a given number of courses and wall heights.

c. each course leveled ± 1/16".

d. overall height plumbed ± 1/4".

e. position metal wall ties.

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. Study figure 22, page 230, of Masonry Simplified, Volume II, the typical metal ties used in cavity walls. Read and study page 245, section Laying Veneered and Cavity Walls. Observe where and why the plumb rule was used. Look at section (A) figure 30, page 236, and examine the cavity wall section at the roof line.

LEARNING ACTIVITY (cont'd):

2. View sound-slide #BM-IX-4 as today's attraction.
3. Apply figure 4 in this task package to your Learning Practice.
4. Proceed on with your Learning Practice, unless you are not sure of your Objective. Check with your instructor.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. "Carpenter's" Square
4. Brick hammer
5. 6' modular spacing rule
6. Mortar board
7. Standard brick
8. 4" block

1. Check with your instructor for the height of the wall; determine the course spacing scales needed for the brick and block.
2. Using figure 1 in this task package, position the brick and block as presented on the first course plan. Head joints 5/16" to 7/16".
3. Lay up 3 courses of brick and back up with 1 course of block. Watch it! What about that 2" cavity?
4. Position 3 metal wall ties in proper position on top of brick and block.
5. Continue to lay up the remaining courses of brick and block to the given height ± 1/8".
6. Correctly position 3 metal wall ties on top of the third block course.
7. All courses to be level ± 1/16".

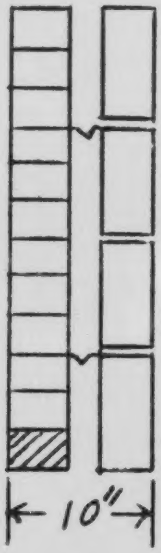
LEARNING PRACTICE (cont'd):

8. Overall given height to be plumb ± 1/4".

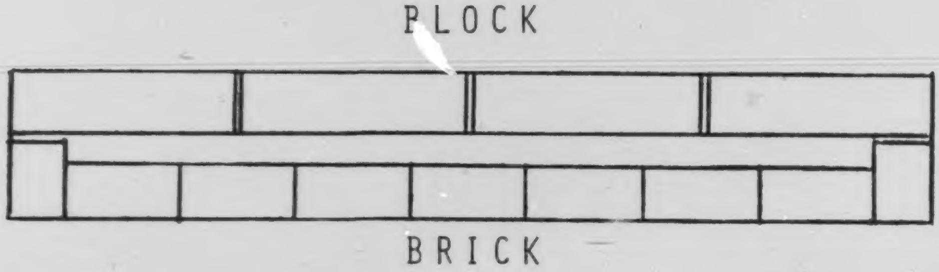
9. This is not exactly Disney World, but it's fun, isn't it?

Figure 1

A 10" STRETCHER CAVITY WALL



ELEVATION VIEW


BLOCK
BRICK

1ST COURSE PLAN

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: MASONRY
COURSE: BRICKLAYING

CE003932 (f)

UNIT X: BUILDING PIERS, PILASTERS, PANELS, AND CHIMNEYS WITH BRICK AND BLOCK

PREREQUISITES: NONE

RATIONALE:

Do you want to get ahead of your peers? If so, in this unit you will be able to construct a brick and block pier. Also, you will construct pilasters, panels, and a chimney, using bricks and blocks. The pilaster is used to stabilize a long section of wall on the inside of the wall. The pier and panel wall will give you the experience of properly tying in the piers to the panel wall; this type of wall is one of the economy brick walls and is used for small, single story structures and garden walls. The chimney cannot be omitted, for it is the avenue by which the heating plant of the building emits its smoke or fumes.

Now, continue by reading the General Objective for the unit and the Specific Objectives for the individual task packages. Proceed next to the Learning Activity, which will supply the information of what you are to do and the proper procedure in doing it.

OBJECTIVE:

GENERAL:

Upon completion of this unit you will be able to construct brick or block piers, pilasters, panels, and chimneys according to plans and specifications.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Lay up a solid brick pier, maintaining the following:
   a. 3/8" to 1/2" mortar space for head joints.
   b. ± 1/8" for overall height for a given number of courses and wall height.
   c. corners plumbed ± 1/4".
   d. courses leveled ± 1/8".

   Your performance will be evaluated upon completion of this task package according to the instructor's checklist.
2. Lay up a hollow brick pier, maintaining the following:
   a. 3/8" to 1/2" mortar space for head joints.
   b. ± 1/8" for overall heights for a given number of courses and wall height.
   c. corners plumbed ± 1/4".
   d. courses leveled ± 1/8".

OBJECTIVE:

Your performance will be evaluated in accordance with the instructor's checklist.

3. Lay up a hollow block pier, maintaining the following:
   a. 5/16" to 7/16" mortar space for head joints.
   b. ± 1/8" for overall height for a given number of courses and wall height.
   c. corners plumbed ± 1/4".
   d. courses leveled ± 1/8".

   Your performance will be evaluated in accordance with the instructor's checklist.

4. Lay up a block wall containing block pilaster, maintaining the following:
   a. 5/16" to 7/16" mortar space for head joints.
   b. ± 1/8" for overall height for a given number of courses and wall height.
   c. corners plumbed ± 1/4".
   d. courses leveled ± 1/8".

   Your performance will be evaluated in accordance with the instructor's checklist.

5. Install a single flue brick chimney, using 12" x 12" flue liners, maintaining the following:
   a. 3/8" to 1/2" mortar space for head joints.

OBJECTIVE (cont'd):

b. ± 1/8" for overall height for a given number of courses and wall height.

c. corners plumbed ± 1/4".

d. courses leveled ± 1/8".

e. install flue liners.

f. square all sides ± 1/16".

Your performance will be evaluated in accordance with the instructor's checklist.

6. Lay up a single flue block chimney, using 8" x 12" flue liners, maintaining the following:

a. 5/16" to 7/16" mortar space for head joints.

b. corners plumbed ± 1/4".

c. courses leveled ± 1/8".

d. ± 1/8" for overall height for a given number of courses and wall height.

e. install flue liners.

f. all corners squared ± 1/16".

Your performance will be evaluated in accordance with the instructor's checklist.

7. Lay up a brick panel wall containing a brick pier at each end, maintaining the following:

OBJECTIVE (cont'd):

a. 3/8" to 1/2" mortar space for head joints.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. courses leveled ± 1/8".

d. corners plumbed ± 1/4".

e. all pier corners squared ± 1/16".

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

Do your thing, for in this unit package you will be able to select whichever one of the seven task packages you desire in the order of your choice. These are all related types of masonry structures, but are not dependent upon each other for their construction. There are unique skills to be learned from each of them. In the task packages you are to view a sound-slide presentation, read the assignments, answer questions and construct a variety of structures. The list of task packages for this unit in numerical order is:

TASK PACKAGE 1: LAYING UP A SOLID BRICK PIER

TASK PACKAGE 2: LAYING UP A HOLLOW BRICK PIER

TASK PACKAGE 3: LAYING UP A HOLLOW BLOCK PIER

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 4: LAYING UP A BLOCK WALL CONTAINING BLOCK PILASTER

TASK PACKAGE 5: LAYING UP A SINGLE FLUE BRICK CHIMNEY

TASK PACKAGE 6: LAYING UP A SINGLE FLUE BLOCK CHIMNEY

TASK PACKAGE 7: LAYING UP A BRICK PANEL AND PIER WALL

Upon completion of the Learning Activity, begin work as outlined above. You will be tested on the unit after completing the seven packages.

UNIT X: CONSTRUCTION OF PIERS, PILASTERS, PANELS, AND CHIMNEYS WITH BRICK AND BLOCK

TASK PACKAGE 1: LAYING UP A SOLID BRICK PIER

PREREQUISITES: UNIT I, TASK PACKAGES 1 & 2; UNIT III, TASK PACKAGE 2; UNIT VII, TASK PACKAGES 1 - 8

RATIONALE:

When it is necessary to support a wood, steel, or reinforced concrete beam, it may be done by laying up solid brick piers. The sizes of the brick piers are determined by the loads that are to be placed on them. The load-carrying capacity of the solid brick pier is increased over that of the same given size hollow brick pier. It is necessary that the piers be built plumb and level with using the smallest head and bed joint possible to the given height. Let's complete the pier and become skilled enough to be able to make enough bread to pay our expenses for a fishing trip to the pier at Atlantic Beach.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a 12" x 16" solid brick pier maintaining the following:

a. 3/8" to 1/2" mortar space for head joints.

b. ± 1/8" for overall heights for a given number of courses and wall height.

c. corners plumbed ± 1/4".

d. courses leveled ± 1/8".

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #BM-X-1.
2. Read Masonry Simplified, Volume I, page 306, section Laying Columns. Refer to figure 36, page 305, observing the center core in place of the 1st and 2nd courses.
3. View figure 2 in this task package, observing the placement of brick on the first course plan and the elevation view.
4. Proceed on with your Learning Practice, keeping clearly in mind your objectives.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 2' level
3. 4' level
4. "Carpenter's square
5. Brick hammer
6. 6' standard brick spacing rule
7. Mortar board
8. Brick

1. Check with your instructor for the height of the pier; determine the brick course spacing for use in building the pier to the given height ± 1/8".
2. Apply figure 1 in this task package to the construction of your pier, using the following procedure:
   a. Dry bond 1st course layout; square all four sides of the pier.
   b. Lay up the four corner brick, using the selected course spacing to the proper height of each course.
   c. Fill out 1st course, all brick leveled ± 1/8".
   d. Use 3/8" to 1/2" mortar space for head joints.
   e. Align and resquare all faces of the brick.
   f. Fill in the center core with brick and mortar to make the pier solid.
3. Lay up the second course, reversing the position of the corner brick so as to stagger the head joints. Follow procedures of the first course.

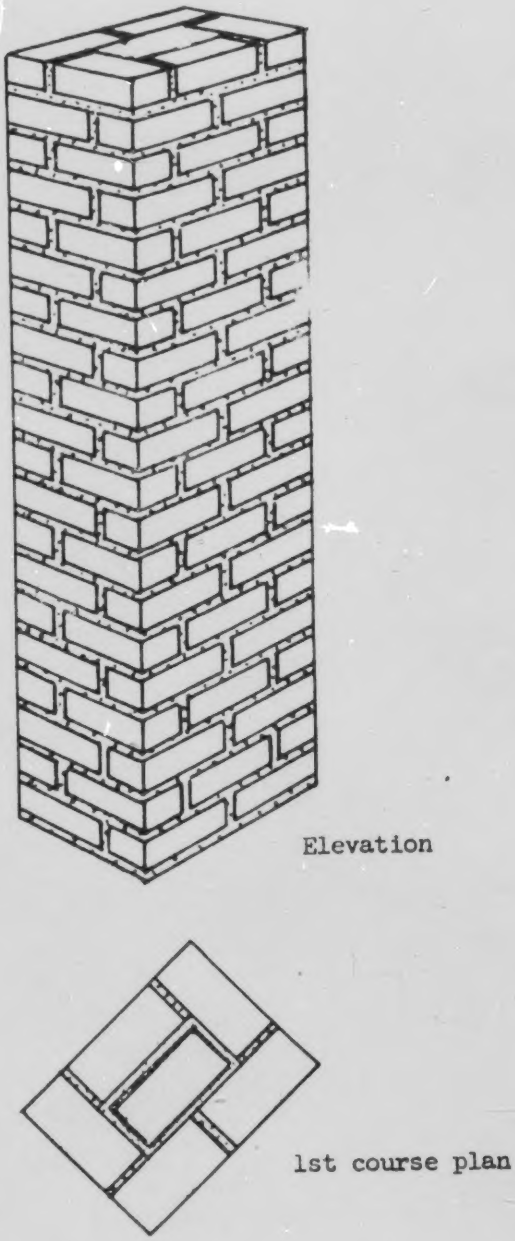
LEARNING PRACTICE (cont'd):

4. Repeat all necessary procedures to lay up the remainder of the courses to the given height ± 1/8".
5. Use the 2' level to level ± 1/8" all courses and for plumbing the first seven courses of the pier. Accuracy will be easier to master using the short level in starting the pier.
6. Use the longer level in plumbing the remainder of the pier to the given height ± 1/8".

This pier is unlike the one you would like to fish from, but after several years of dedicated work you will have the extra green to be able to charter a fishing boat.

A 12" x 16" SOLID BRICK PIER

Figure 1


Elevation
1st course plan

UNIT X: CONSTRUCTION OF PIERS, PILASTERS, PANELS, AND CHIMNEYS WITH BRICK AND BLOCK

TASK PACKAGE #2: LAYING UP A HOLLOW BRICK PIER

PREREQUISITES: UNIT X, TASK PACKAGE #1

RATIONALE:

Don't think that building a hollow brick pier is a hollow task, because it isn't. Also, this project doesn't mean that you will go to the hills and build a brick pier in a hollow. Some moonshiner might take you for a revenooer and try to blast you. We don't want that to happen, so get on with the package.

In this task package you will construct a hollow brick pier. In the previous task package you built a solid brick pier (different size) that would support a greater weight. The hollow brick pier is used in the same manner as the solid pier, except that it is not expected to support as great a load. The most popular usage of the hollow brick piers is in residential foundations and supporting piers in commercial buildings. In the construction of the pier, quality workmanship is the priority. Speed sometimes makes waste so build with the utmost care. One of the reasons much of the brick work of several hundred years' duration is still standing and useful is due to quality workmanship.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a 20" x 24" hollow brick pier maintaining the following:

a. 3/8" to 1/2" mortar space for head joints.

b. ± 1/8" for overall heights for a given number of courses and wall height.

c. corners plumbed ± 1/4".

d. courses leveled ± 1/8".

Your performance will be evaluated in accordance with the instructor's check list.

LEARNING ACTIVITY:

1. View sound-slide package #BM-X-1 as today's star attraction.
2. View figure 1 in this task package, observing the placement of brick on the first course plan and the staggered head joints of the elevation view. Observe the omittance of brick and mortar in the center of the pier.
3. After you have studied the drawings and Objective and fully understand them, proceed with your Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel	5. Brick hammer
2. 2' level	6. 6' standard spacing rule
3. 4' level	7. Mortar board
4. "Carpenter's" square	8. Brick

1. Check with your instructor for the height of the pier; determine the brick course spacing for use in building the pier to the given height ± 1/8".
2. Apply figure 1 in this task package to the construction of your pier using the following:
   a. dry bond first course layout; square all four sides of the pier.
   b. lay up the four corner brick, setting the brick to your determined course height.
   c. continue laying the first course, leveling ± 1/8" all brick.
   d. align and resquare all faces of the brick.
   e. use 3/8" to 1/2" mortar spacing for head joints.
3. Position corner brick as shown on the elevation view of figure 1 and fill in the remainder of the course.
4. Repeat all necessary procedures to lay up the pier to its given height ± 1/8".
5. Use 3' level for course leveling ± 1/8" and for plumbing the first seven courses of the pier.

LEARNING PRACTICE (cont'd):

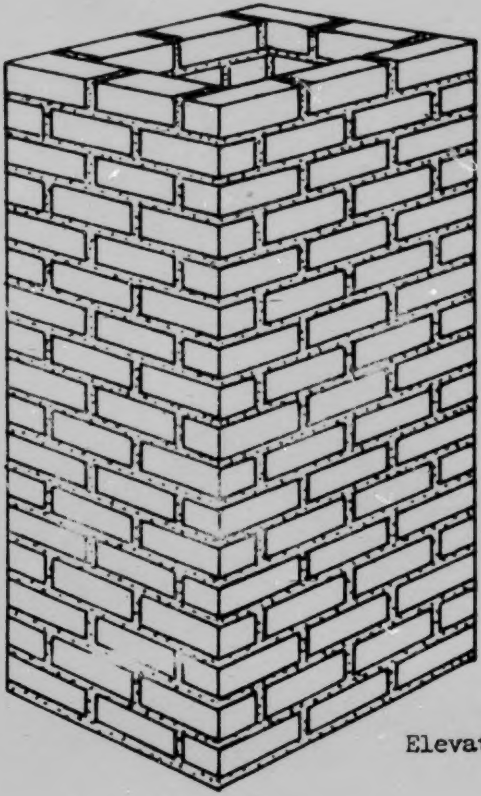
6. Use the longer level in plumbing the remainder of the pier to the given height ± 1/8".

See one of your peer group and let him know how simple it is to build a hollow brick pier. Perhaps you had better check your Objective for pier size before having the instructor evaluate your work.

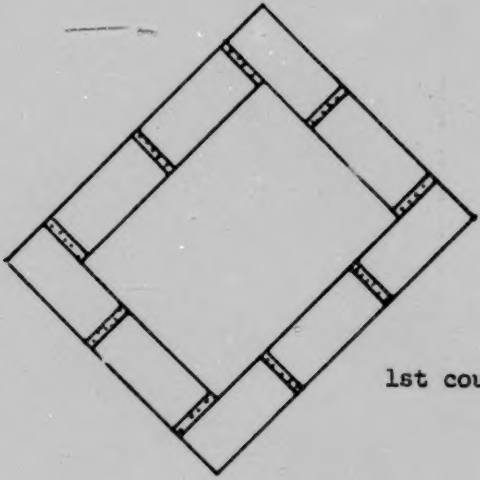
You glided right through it.

A 20" X 24" HOLLOW BRICK PIER

Figure 1



Elevation



1st course plan

UNIT X: CONSTRUCTION OF PIERS, PILASTERS, PANELS, AND CHIMNEYS WITH BRICK AND BLOCK

TASK PACKAGE #3: LAYING UP A HOLLOW BLOCK PIER

PREREQUISITES: UNIT I, TASK PACKAGES 1, 2 and 4; UNIT III, TASK PACKAGE 2; UNIT VIII, TASK PACKAGES 1 - 3

RATIONALE:

Among many of the different kinds of work experiences a brick mason will encounter is the construction of hollow block piers. The pier block design is similar to the stretcher block except both ends of the block are completely filled in solid. It is sometimes called a double corner block. Block piers are usually constructed as load-bearing structures in foundations to carry the loads resting on them. The block piers are more economical to build than a brick pier and feature labor and material savings.

You have probably heard of people going to Atlantic City, New Jersey, to visit the Steel Pier to have fun. Well, you too can have as much fun as a visit to the Steel Pier when you lay up and build your own hollow block pier. Gee, this sounds exciting, doesn't it!

OBJECTIVE:

Upon completion of this task package you will be able to lay up a 24" x 32" hollow block pier maintaining the following:

a. 5/16" to 7/16" mortar space for head joints.

b. ± 1/8" for overall heights for a given number of courses and wall height.

c. corners plumbed ± 1/4".

d. courses leveled ± 1/8".

Your performance will be evaluated in accordance with your instructor's check list.

LEARNING ACTIVITY:

1. The special feature for today is sound-slide package #BM-X-2.
2. View figure 1 in this task package. Observe the block layout on the first course. There aren't any pieces of block showing, so in arranging your layout it should have all full block 8" x 8" x 16".
3. Observe also in figure 1 the 2nd course plan how head joints are rearranged to stagger joints.
4. Review Unit I, task package 4, if necessary.
5. Proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel	5. Brick hammer
2. 2' level	6. 6' modular spacing rule
3. 4' level	7. Mortar board
4. "Carpenter's" square	8. 8" block

1. Check with your instructor for the height of the pier; determine the block course spacing for use in building the pier to the given height ± 1/8".
2. Using figure 1 in this task package, dry lay out the 24" x 32" hollow block pier.
3. Square four sides using the "carpenter's" square, and trace lay out on the floor with a marking pencil.
4. Lay up in mortar the first course of block, leveling, plumbing, squaring, and aligning them. Refer to first course plan of figure 1.
5. Reversing the corner block, to stagger head joints, lay up the second course. Refer to second course plan of figure 1.
6. Repeat operations of the first two courses to the given height of the wall ± 1/8".
7. Use 5/16" to 7/16" mortar space for head joints.
8. All courses leveled ± 1/8".

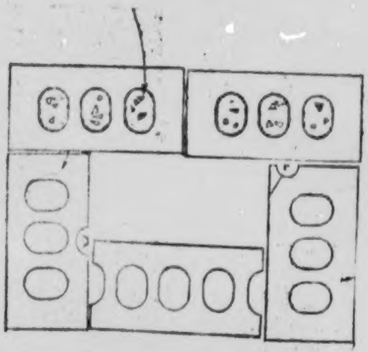
LEARNING PRACTICE (cont'd):

9. Overall height of the given wall ± 1/4" for plumb.

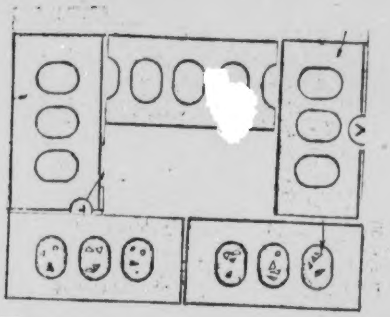
Now that you have proudly completed this task package, have your instructor evaluate it. See, you knew you did a good job on this one, didn't you?

Tools still clean and in good working order?

24" x 32" BLOCK PILASTER



2ND COURSE PLAN



1ST COURSE PLAN

Figure 1

UNIT X: CONSTRUCTION OF PIERS, PILASTERS, PANELS, AND CHIMNEYS WITH BRICK AND BLOCK

TASK PACKAGE 4: LAYING UP A BLOCK WALL CONTAINING BLOCK PILASTER

PREREQUISITES: UNIT I, TASK PACKAGES 1, 2 & 4; UNIT III, TASK PACKAGE 2; UNIT VIII, TASK PACKAGES 1-4

RATIONALE:

Have you ever stiffened your upper lip? Maybe you have and maybe not. At any rate, there is a certain stiffening process which uses block pilasters, and which you should find interesting.

Concrete block walls with block pilasters are used to stiffen long walls and serve as increased bearing surfaces for the ends of beams. Pilasters are used many times in the building of foundation block walls where the wall is larger than 30 feet. There are other variables that give us reason for building pilasters into a wall such as the depth of the foundation into the ground; the ground creates more lateral pressure on the wall, and in quality construction the use of pilasters helps eliminate the cracks appearing in a block foundation. (These cracks allow water to leak into the basement.) Another variable is the local building codes citing that ends of beams must be supported by pilasters.

Other conditions under which pilasters are used in a wall are in building retaining walls, exterior walls and interior walls for

RATIONALE (cont'd):

commercial building.

The strength added to a block wall by adding a pilaster is like the strength you receive from physical exercise, so after finishing this wall,feel your muscles.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a 8" block wall containing a 8" x 24" block pilaster, maintaining the following:

a. 5/16" to 7/16" mortar space for head joints.

b. ± 1/8" for overall heights for a given number of courses and wall height.

c. corners plumbed ± 1/4".

d. courses leveled ± 1/8".

e. square pilaster ± 1/16".

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Hippity hop on down to the resource center and view sound-slide package BM-X-2.

LEARNING ACTIVITY (cont'd):

2. Read and study Masonry Simplified, Volume II, pages 102-104, sections Concrete Block Foundations and Concrete Block Pilaster; page 119, section Concrete Block Pilasters. Why is it necessary to build pilasters into a wall? What length of foundation wall does not need a stiffening member built into it? Write your answers to these questions on a sheet of paper and discuss them with your instructor as you are doing your Learning Practice.
3. View figure 1 in this task package for position of first and second course plan block.
4. With the Learning Activity and Objective in mind, proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 2' level
3. 4' level
4. Carpenter's square
5. Block hammer
6. 6' modular spacing rule
7. Mortar board
8. 8" stretcher and pier block.

---

1. Check with your instructor for the height of the 64" long 8" block wall with 8" x 24" block pilaster; determine the block course spacing for use in building the wall with pilaster height ± 1/8".

LEARNING PRACTICE (cont'd):

2. Using figure 1 in this task package refer to the top course layout of elevation view; it is identical to the first course layout. Dry lay out the 8" wall and the 8" x 24" pilaster; square the pilaster from the inside face of the 8" wall, maintaining 5/16" to 7/16" head joints. Trace the layout on the floor.
3. Lay up first course to the determined height, leveling ± 1/8", plumbing ± 1/16", squaring ± 1/16" and aligning the first course.
4. Lay up second course referring to second course plan in figure 1.
5. Continue laying wall and pilaster to the given height ± 1/8".
6. All courses level ± 1/8".
7. All corners plumb ± 1/4" to given height.

The added strength the pilaster gives to the wall is parallel to the added skills you are acquiring to be a stalwart individual in your family and community.

Hey, diddle, diddle! You've just jumped over a task package.

CONCRETE BLOCK WALL AND BLOCK PILASTER

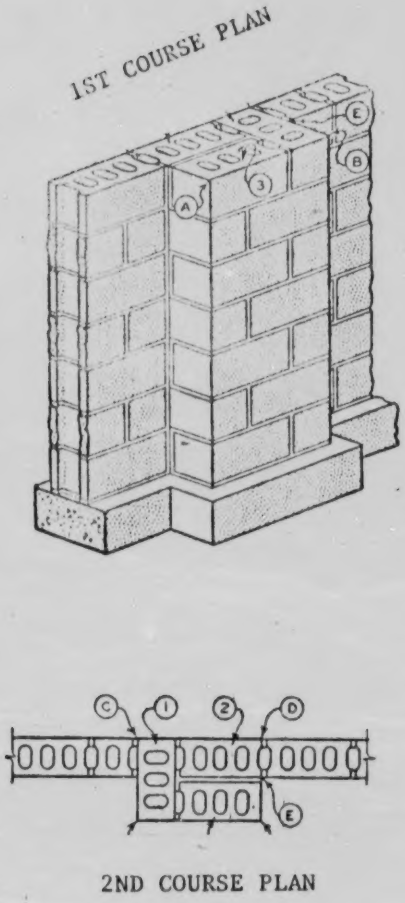

1ST COURSE PLAN
E
B
3
A
C
1
2
D
E
2ND COURSE PLAN

Figure 1

UNIT X: CONSTRUCTION OF PIERS, PILASTERS, PANELS, AND CHIMNEYS WITH BRICK AND BLOCK

TASK PACKAGE 5: LAYING UP A SINGLE FLUE BRICK CHIMNEY

PREREQUISITES: UNIT I, TASK PACKAGES 1 and 2; UNIT VII, TASK PACKAGE 1;
UNIT VII, TASK PACKAGES 1-7; UNIT X, TASK PACKAGE 2

RATIONALE:

Chimneys have long been useful and interesting to people. Some chimneys became familiar landmarks on the landscape. A smoking chimney was often the symbol of hospitality. And a large city with many chimneys required chimney sweeps. Since you don't plan to become a chimney sweep, just sweep yourself into this task package.

There are not many houses, offices, churches, merchandising stores, or other inhabited buildings in your community that do not have a chimney. Some are very ornate while many are a small single-flue chimney. These chimneys have two main purposes. The first and probably most familiar is that they carry away fumes (smoke) resulting from the combustion of all types of fuels. Such fumes or gases are injurious to the health of the occupants of buildings and in many instances constitute a fire hazard, unless they are disposed of by the use of a properly constructed chimney. The fumes must be carried off in such a way as to provide insulation for the

RATIONALE (cont'd):

structural wooden members of the building against fire and high enough to be dissipated harmlessly into wind and air.

The second purpose of the chimney is that it serves to create a draft. A draft in a chimney provides a constant supply of fresh air which is necessary to keep the fires burning.

So, in building your chimney, use the skills necessary for quality workmanship that will make it one of your memorials.

OBJECTIVE:

Upon the completion of this task package you will be able to lay up a single flue brick chimney using flue liners, maintaining the following:

a. 3/8" to 1/2" mortar space for head joints.

b. ± 1/8" for overall heights for a given number of courses and wall height.

c. corners plumbed ± 1/4".

d. courses leveled ± 1/8".

e. install flue liners.

f. square all sides ± 1/16".

Your performance will be evaluated according to the instructor's checklist.

LEARNING ACTIVITY:

1. Read Masonry Simplified, Volume I, pages 306 and 307, section Laying a Simple Chimney, and Masonry Simplified, Volume II, pages 233 through 241. Observe on page 235 why the chimneys lined with flue liners are superior to an unlined chimney, and on page 233 the conditions on the inside of a chimney that is used to carry off the gas vapors when the flue is in operation.
2. View sound-slide package BM-X-3 as today's stellar attraction.
3. View figure 1 in this task package. Observe the inserted flue liner inside the chimney and block layout.
4. Proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 2' level
3. 4' level
4. Carpenter's square
5. Brick hammer
6. 6' standard spacing rule
7. Mortar board
8. Brick
9. Flue liners 8" x 8"

1. Check with your instructor for the height of the chimney; determine the brick course spacing to the given height ± 1/8".
2. Apply figure 1 in this task package to the construction of your single flue brick chimney, using the same methods described in task package 3 of this unit. This chimney construction is

LEARNING PRACTICE (cont'd):

the same as the hollow brick pier except for the installation of the flue liners.

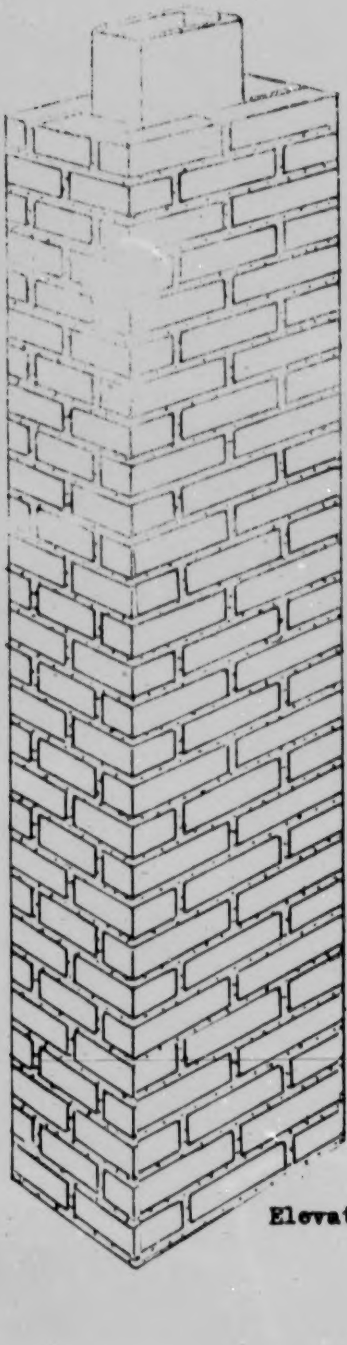
3. One method of inserting flue liners is to insert them into the cavity after seven or eight courses of brick are laid up. This enables you to have finger room to grasp the flue liners. The hanging mortar should be cut off so the liners can be inserted without problems.
4. The other method is to set the flue liner in place and build the brick around. This method adds a hindrance to laying up the brick. If the first method is used dry, lay out the first course to space the brick around the flue liners and then trace the layout to the floor.
5. Build the chimney to its given height, employing the methods already used.
6. Corners plumbed ± 1/4".
7. Courses leveled ± 1/8".
8. Square off sides ± 1/16".
9. Flue liners to have mortar placed between them.

The flue liner adds years of life to a chimney just the same as your winter coat lining will add years to your life.

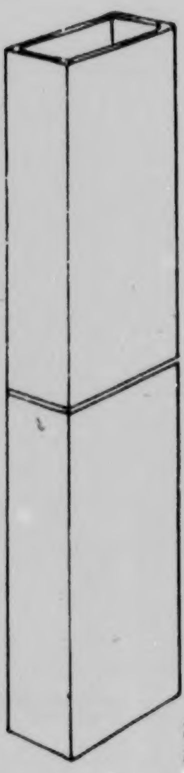
Chim, chimney, chim, chimney, chim, chim, cheree - A guy who finishes a task package is lucky as can be!

A ONE-FLUE CHIMNEY

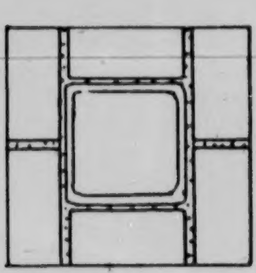
Figure 1



Elevation



2 lengths of flue lining



1st course plan

UNIT X: CONSTRUCTION OF PIERS, PILASTERS, PANELS, AND CHIMNEYS WITH BRICK AND BLOCK

TASK PACKAGE 6: LAYING UP A SINGLE FLUE BLOCK CHIMNEY

PREREQUISITES: UNIT X, TASK PACKAGE 3

RATIONALE:

As you know, without chimneys Santa Claus would be hampered in his activities. You will be performing a real service for Old Santa in your building of chimneys. So learn here how to build a single flue block chimney.

In the previous task package you learned of the single flue brick chimney with its functions. The functions of this single flue block chimney will not change, but the physical properties of the masonry units do. You also discovered it is more economical to build with block than with brick; therefore, many block chimneys are built, usually in the interior of the building, so they can be enclosed except for the portion projecting out of the roof. The chimney top is constructed of brick or block again, depending on available money to do the job. A chimney has a high concentration of weight which also is known as high density of weight; therefore, it needs a larger footing than the average wall.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a single flue block chimney using flue liners maintaining the following:

a. 5/16" to 7/16" mortar space for head joints.

b. all corners plumbed ± 1/4".

c. all courses leveled ± 1/8".

d. ± 1/8" for overall height for a given number of courses and wall height.

e. install flue liners.

f. all corners squared ± 1/16".

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-X-3 as today's super thriller.
2. Read Masonry Simplified, Volume II, pages 246 through 254, section Kinds of Chimneys. Observe on page 250, figure 19, a single flue chimney constructed of 4" concrete block. In reading on page 246, note that flue liners are used in the construction of this type of chimney.

LEARNING ACTIVITY (cont'd):

3. View figure 1 in this task package for arrangement of the first and second course blocks and flue liner.

4. After reading about the Kinds of Chimneys and understanding figure 1 in this task package, proceed to the Learning Practice, keeping clearly in mind the Objective.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 2' level
3. 4' level
4. Carpenter's square
5. Brick hammer
6. 6' modular spacing rule
7. Mortar board
8. 4" x 8" x 16" block
9. 12" x 12" flue liners

1. Check with your instructor on the height of the block chimney; determine the block course spacing to the given height ± 1/8".

2. Apply figure 1 in this task package to construct the 20" x 20" block chimney, using 12" x 12" flue liners. Refer to the first course plan for block layout, and use either of the two methods for inserting the flue liners from Unit X, task package 5.

3. Lay up the second course, referring to the layout of the second course plan in figure 1.

4. Continue laying up the block to the given height, alternating the first and second course plans.

LEARNING PRACTICE (cont'd):

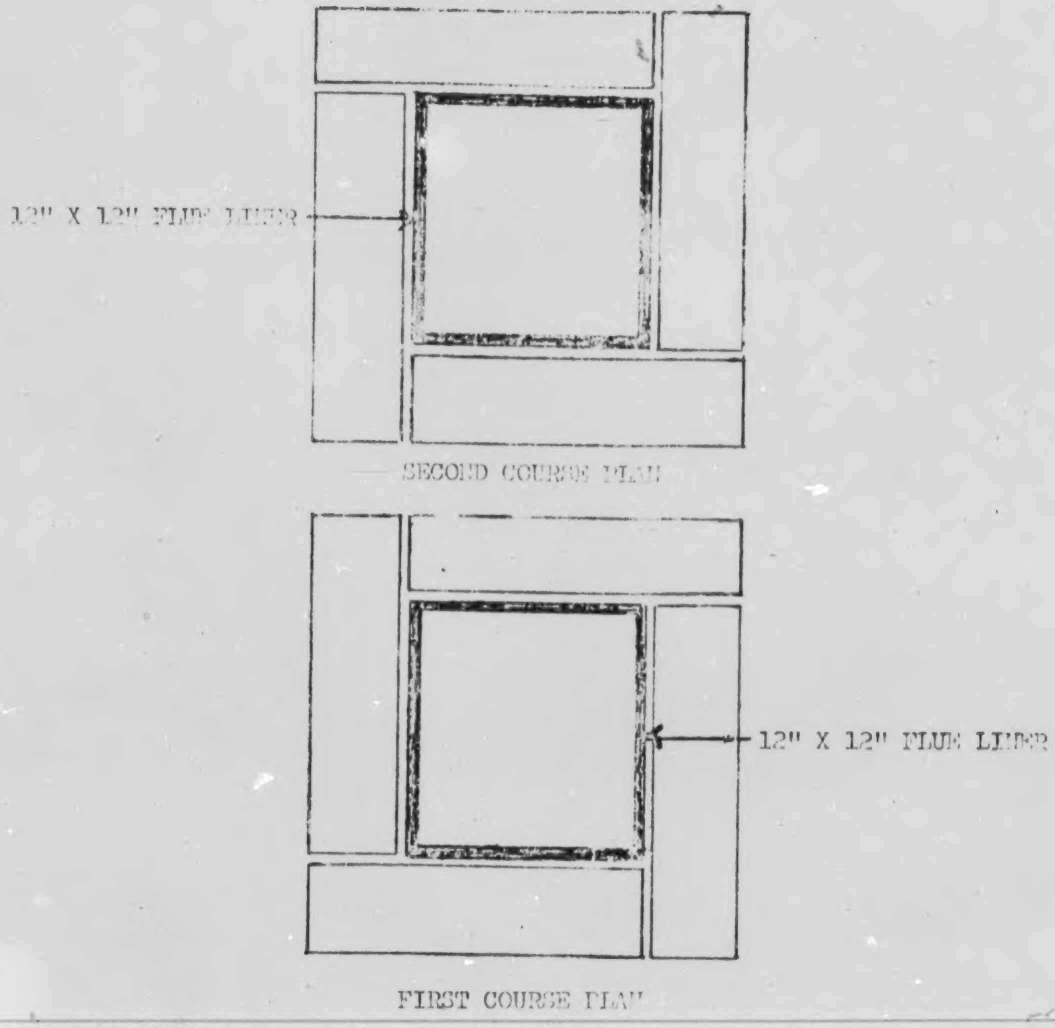
5. All courses leveled ± 1/8".

6. All corners plumbed ± 1/4".

7. All corners squared ± 1/16".

The next installment is task package 7 of this unit.

He who builds chimneys always works upward!


12" X 12" FLUE LINER
SECOND COURSE PLAN
12" X 12" FLUE LINER
FIRST COURSE PLAN

SINGLE FLUE CONCRETE BLOCK CHIMNEY

Figure 1

UNIT X: CONSTRUCTION OF PIERS, PILASTERS, PANELS AND CHIMNEYS

TASK PACKAGE 7: LAYING UP A BRICK PANEL AND PIER WALL

PREREQUISITES: UNIT VII, TASK PACKAGE 5

RATIONALE:

Still interested in fighting inflation? Want to economize some more? Then try another of the economy walls.

In our chatting a while back we discussed the economy of block walls as opposed to the same size wall in brick or brick and block. This is still another of the walls that are known as economy walls. This type of wall was developed as a means of saving appreciable amounts of material and labor. The use of pier and panel wall is usually limited to one-story residences and small one-story structures. Another use of this type of wall is that of a garden wall. If you ever have the opportunity to visit Williamsburg, Virginia, the showplace of colonial structures, you will see many of these types of garden wall structures. So, going down the garden pathway of life, you will be able to take advantage of the better things by perfecting your knowledge and skills of the mason's trade.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a brick panel wall containing a brick pier at each end, maintaining the following standards:

a. 3/8" to 1/2" mortar space for head joints.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. courses leveled ± 1/8".

d. corners plumbed ± 1/4".

e. all pier corners squared ± 1/16".

Your performance will be evaluated in accordance with your instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-X-4, a terrific feature.
2. View figure 1 in the task package. Observe the second course plan of the position of the two half brick at the piers. This is necessary to get the staggered joints viewed in the elevation.
3. Read Masonry Simplified, Volume II, pages 331 and 368, sections on Pier and Panel Walls.
4. Relate two uses of the pier and panel walls in a discussion with your instructor as you are working on the Learning Practice. After completing the Learning Activity and knowing

LEARNING ACTIVITY (cont'd):

the Objective, proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Carpenter's square
4. Brick hammer
5. 6' standard spacing rule
6. Mortar board
7. Brick
8. Metal ties

1. Check with your instructor for the height of the wall; determine the brick course spacing to the given height ± 1/8".
2. Apply figure 1 in this task package to the construction of your pier and panel wall. This task package is directly related to BM-X-5, except for the thickness of the main wall and the position of the piers.
3. The first and second course plans give you the position of the bricks, so proceed with the knowledge gained in other task packages to the completion of the given height.
4. Metal wall ties properly placed.
5. All courses leveled ± 1/8".
6. All corners plumbed ± 1/4".
7. All pier corners squared.
8. Head joint spacing 3/8" to 1/2".

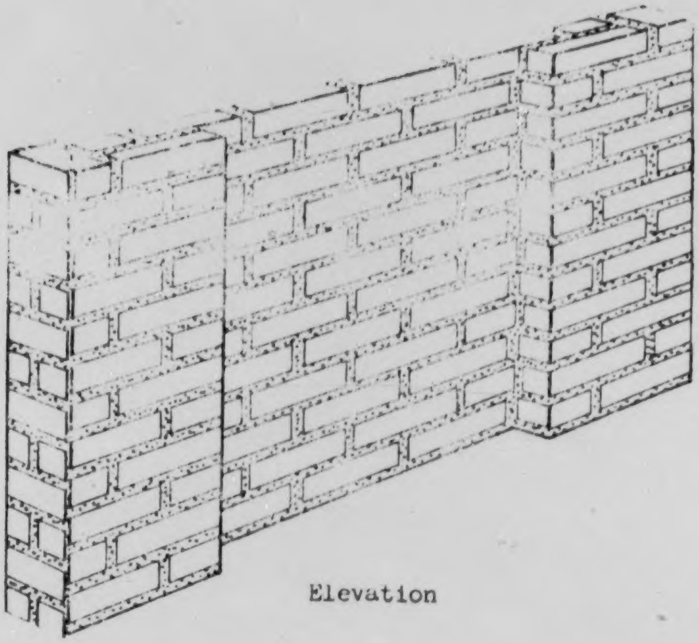
LEARNING PRACTICE (cont'd):

This completes another unit of task packages and you are doing okay. You have not been goofing off to get this far, so stay in the mainstream and get yourself another task package.

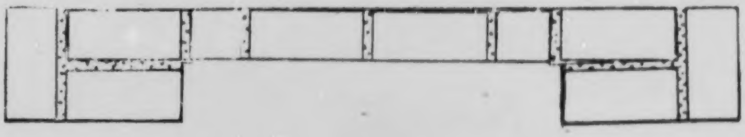
Rise to new heights - like a brick chimney.

Figure 1

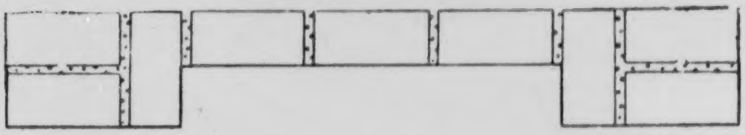
PANEL AND PIER WALL



Elevation

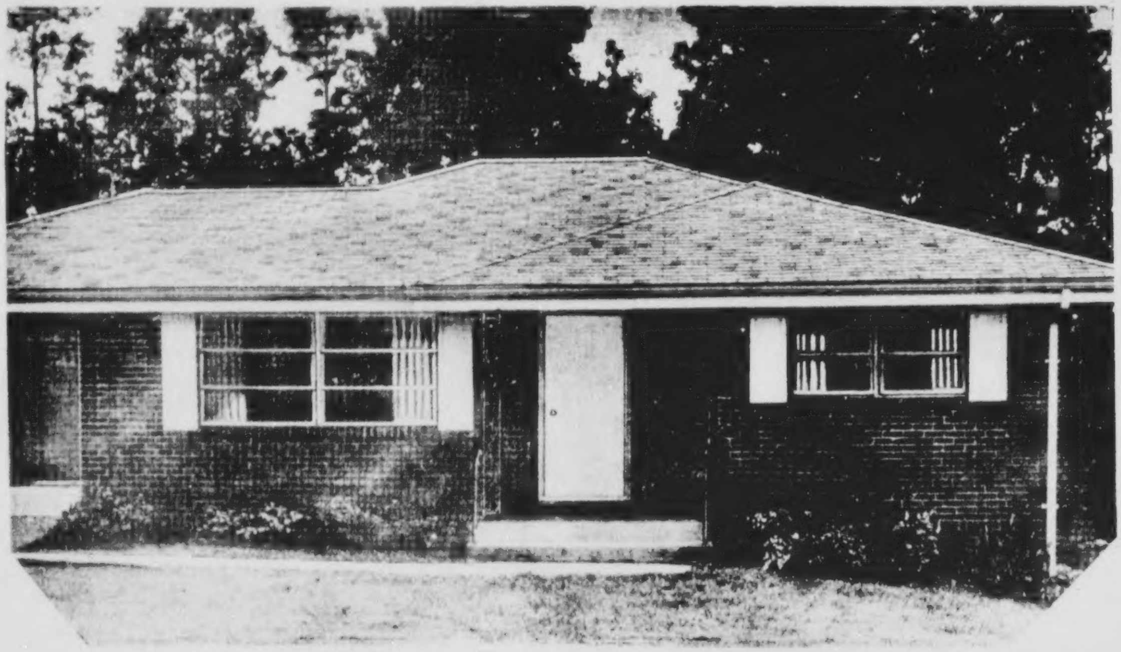


2ND COURSE PLAN



1ST COURSE PLAN

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330



CLUSTER: MASONRY
COURSE: BRICKLAYING

CE003932 (-12)

UNIT XI: BUILDING BRICK AND BLOCK VENEER WALLS

PREREQUISITES: UNIT I, TASK PACKAGES 1-7; UNIT III, TASK PACKAGE 1; UNIT VII, TASK PACKAGES 1 & 2; UNIT VIII, TASK PACKAGE 2; UNIT XI, TASK PACKAGES 1-4

RATIONALE:

Most of the brickwork constructed in your vicinity on houses is of the brick veneer type of masonry. The brick veneer has the appearance of solid brick, but is only one wythe attached to a frame structure. In this unit you will be able to construct brick veneer and block veneer walls, attaching to a frame structure. Along with a straight wall, you will be building around door and window openings, installing window sills and lintels over the door and window (s), erecting scaffolding and working from the scaffold to construct the brick and block wall to a one story height. You will acquire the skill of using the corner pole system as well as the plumb line at the corners to construct the corner lead for those packages.

Continue, now, by reading the General Objective for the unit and the Specific Objectives for the individual packages.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to construct a brick and a block veneer wall, attaching it to a frame structure.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Lay up a brick veneer wall, in stretcher bond, using a plumb line at the corner, maintaining the following:
   - a. 3/8" to 1/2" mortar spacing for head joints.
   - b. ± 1/8" for overall height for a given number of courses and wall height.
   - c. courses leveled + 1/16" while building corner leads.
   - d. brick laid to the line.

   Your performance will be evaluated in accordance with the instructor's checklist.

2. Lay up a block veneer wall, using a plumb line at the corner, maintaining the following:
   - a. 5/16" to 7/16" mortar space for head joints.
   - b. ± 1/8" for overall height for a given number of courses and wall height.
   - c. corner leads leveled ± 1/16".
   - d. blocks laid to a line.

OBJECTIVE (cont'd):

Your performance will be evaluated in accordance with the instructor's checklist.

3. Lay up a brick veneer wall, in stretcher bond, using the corner pole system, maintaining the following:
    a. set up corner poles.
    b. plumb corner pole + 1/8".
    c. ± 1/8" for overall height for a given number of courses and wall height.
    d. all brick laid to the line.
    e. 3/8" to 1/2" mortar space for head joints.

    Your performance will be evaluated in accordance with the instructor's checklist.

4. Lay up a veneer brick wall at a wooden door jamb location maintaining the following:
    a. ± 1/4" for overall height for a given number of courses and wall height.
    b. 3/8" to 1/2" mortar space for head joints.
    c. all brick laid to the line.

    Your performance will be evaluated in accordance with the instructor's checklist.

5. Lay up a brick veneer wall at a window jamb location, maintaining the following:

OBJECTIVE (cont'd):

  a. + 1/4" for overall height for a given number of courses and wall height.

  b. 3/8" to 1/2" mortar space for head joints.

  c. all brick laid to the line.

  Your performance will be evaluated according to the instructor's checklist.

6. Install a lintel over a window or a door, to support brickwork above, and install a brick window sill, maintaining the following:

  a. installation of lintel above a window or a door, according to building code specifications.

  b. 3/8" to 1/2" mortar space for head joints.

  c. ± 1/8" for overall height for a given number of courses and wall height.

  d. all brick laid to the line above window and door openings.

  e. whole rowlock or header brick properly spaced in window opening.

  Your performance will be evaluated in accordance with the instructor's checklist.

7. Lay up a block veneer wall, using the corner pole system, maintaining the following:

  a. proper setup of corner poles.

  b. plumb corner pole ± 1/8".

  c. ± 1/8" for overall height for a given number of courses and wall height.

OBJECTIVE (cont'd):

d. all block laid to the line.

e. 5/16" to 7/16" mortar space for head joints.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

In order to complete this unit successfully, you should begin your work on task package 1, and then proceed to complete each task package, in order, until you have completed the seven packages in the unit. The first two task packages could be interchanged in the order of completion, but the next five must be done in numerical order for each is dependent on the other package (s) for their completion. It would be difficult to install a lintel over a door or window without the other necessary section of the veneer wall. In the task packages you are to view the sound-slide presentation, read the assignments, and construct the section of walls in each package. The titles of the packages contained in this unit are:

TASK PACKAGE 1:	LAYING A BRICK VENEER WALL, IN STRETCHER BOND, USING A CORNER PLUMB LINE
TASK PACKAGE 2:	LAYING A 4" BLOCK VENEER WALL, USING A PLUMB LINE AT THE CORNER
TASK PACKAGE 3:	LAYING UP A BRICK VENEER WALL, IN STRETCHER BOND, USING THE CORNER POLE SYSTEM

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 4: LAYING A BRICK VENEER WALL AT A WOODEN DOOR JAMB

TASK PACKAGE 5: LAYING A BRICK VENEER WALL AT A WINDOW JAMB LOCATION

TASK PACKAGE 6: INSTALLING LINTELS, BRICK SILLS AND LAYING UP BRICK WALL ABOVE WINDOW OR DOOR

TASK PACKAGE 7: LAYING A BLOCK VENEER WALL USING CORNER POLE SYSTEM

If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT XI: CONSTRUCTION OF BRICK AND BLOCK VENEER WALLS

TASK PACKAGE 1: LAYING A BRICK VENEER WALL, IN STRETCHER BOND, USING A CORNER PLUMB LINE

PREREQUISITES: UNIT I, TASK PACKAGES 1-7; UNIT III, TASK PACKAGE 1;
UNIT VII, TASK PACKAGES 1 & 2

RATIONALE:

Beat inflation with an economic wall. You also whip moisture, heat and the penetration of solids with the kind of wall discussed in this task package.

One wythe of brick as a veneer on frame or masonry walls is perhaps the most used of the wall structures. The veneered brick gives the appearance of a solid brick wall as well as other advantages - such as economy in construction over solid masonry, and better insulation against moisture, heat and the penetration of solids into the structure. The brick veneer must be anchored to the existing walls by means of different types of metal wall ties to the particular construction materials. Usually the stretcher bond is the dominant pattern used in this type of wall.

Are you ready to stretch your attention on into the task package? Good. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a brick veneer wall in stretcher bond using a plumb line at one corner maintaining the following:

a. 3/8" to 1/2" mortar spacing for head joints.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. courses leveled ± 1/16" while building corner leads.

d. brick laid to the line.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XI-1, today's super attraction.
2. Read Masonry Simplified, Volume II, pages 345 through 350; observe in figure 32, page 348, the difference between brick veneer walls and solid walls.
3. View figure 1 in this task package and note placement of brick veneer to the frame wall.
4. Proceed now to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Brick hammer
4. 6' standard spacing rule
5. Mason's line
6. Corner blocks or pins
7. Mortar board
8. Brick
9. 6d or 8d common nails
10. Metal wall ties

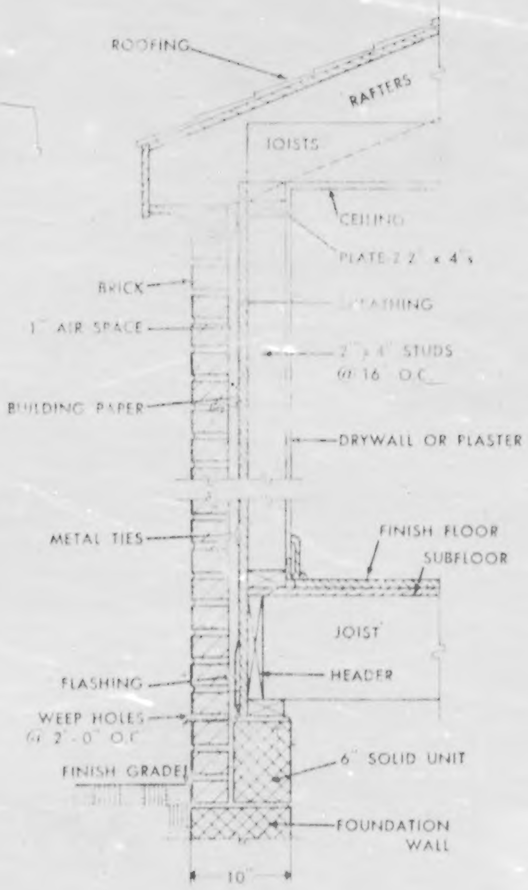
1. Check with your instructor for the height of the wall; determine the brick course spacing for the wall height ± 1/8".
2. Establish plumb lines at the corners. (Consult with your instructor for information and proper set-up before going to the next step.)
3. View figure 1 in this package for a wall section of brick veneer.
4. Construct, using past information and experiences, a short corner lead at each corner, positioning the face of the brick the same distance from frame siding as the location of plumb line. Attach bottom of plumb line with a nail in the bottom bed joint of the corner lead. Stretch the line tight.
5. Lay up the three courses of brick, laying to the line.
6. Continue building corner leads and filling in the wall to the given height ± 1/8".
7. Maintain 3/8" to 1/2" head joints.

LEARNING PRACTICE (cont'd):

8. Courses leveled ± 1/16" while building corner leads.
9. Properly position metal wall ties, nailing to the studs. (Again consult your instructor how to place wall ties for a veneer job.)

You think using the plumb line makes your work simpler, faster, and more accurate, but wait till you get to the third task package. You're getting plumb good at masonry work.

4" BRICK VENEER WALL


ROOFING
RAFTERS
JOISTS
CEILING
PLATE 2 2" x 4"s
BRICK
SHEATHING
1" AIR SPACE
2" x 4" STUDS
@ 16" O.C.
BUILDING PAPER
DRYWALL OR PLASTER
METAL TIES
FINISH FLOOR
SUBFLOOR
JOIST
FLASHING
HEADER
WEEP HOLES
@ 2'-0" O.C.
FINISH GRADE
6" SOLID UNIT
FOUNDATION
WALL
10"

TYPICAL WALL SECTION
BRICK VENEER ON FRAME

Figure 1

UNIT XI: CONSTRUCTION OF BRICK AND BLOCK VENEER WALLS

TASK PACKAGE 2: LAYING A 4" BLOCK VENEER WALL USING A PLUMB LINE AT THE CORNER

PREREQUISITES: UNIT I, TASK PACKAGE 1-7; UNIT III, TASK PACKAGE 1;
UNIT VIII, TASK PACKAGE 2

RATIONALE:

Although most of the block used in buildings are not used in veneer type construction, it is sometimes necessary because of economy or preference by the owner to use the block veneer wall. Again, as with the brick veneer wall, the block veneer is even more economical as well as a better insulation against moisture, heat, and cold. The block veneer surface should be prepared by using a waterproofing material. Some of these materials are a clear silicon paint that doesn't discolor the block and colored masonry waterproof paint. There are also decorative patterns of 4" block to enhance the beauty of the block.

Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a 4" block veneer wall, using a plumb line at corner, meeting the following:

a. 5/16 to 7/16" mortar space for head joints.

b. ± 1/4" [illegible] given number of courses and wall height.

c. corner leads leveled [illegible].

d. blocks laid to a line.

e. install metal ties.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XI-2, a really good show.

2. View figure 1 of this task package for block position for corner lead. Observe the 3/4 length block used at the corner. The purpose for cutting these blocks to this length is to create the elevation staggered joints for a half bond. This is to be used only with 4" x 8" x 12" block.

3. There is no textbook reading for this task package, so put to use the knowledge acquired in previous task packages and proceed

LEARNING ACTIVITY (cont'd):

with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Brick hammer
4. 6' modular spacing rule
5. Mason's line
6. Corner blocks
7. Mortar board
8. 4" x 8" x 16" block
9. 6d or 8d common nails
10. Metal wall ties

1. Check with your instructor for the height of the wall; determine the block course spacing for the wall height ± 1/8".

2. Lay out dry the first course of block, using greater than one half a block for the closer unit. Reverse one of the corners if less than one half or closer. See figure 1 for corner layout of 4" block to achieve center bonding.

3. Using the established plumb lines at the corners, construct a three block course corner lead, leveling each course ± 1/16".

4. After the corners on opposite ends of the wall are built, stretch a line between corners and lay block, maintaining 5/16" to 7/16" head joints to the line. I know you are careful not to crowd that line. Are you keeping the tools out of your path of work when not using them?

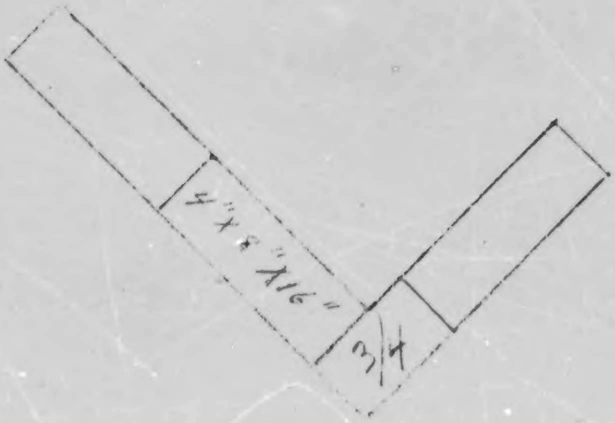
LEARNING PRACTICE (cont'd):

5. Fill in the wall to the top of corner leads, then change the process back to building corner leads and filling the wall between them to the given height.

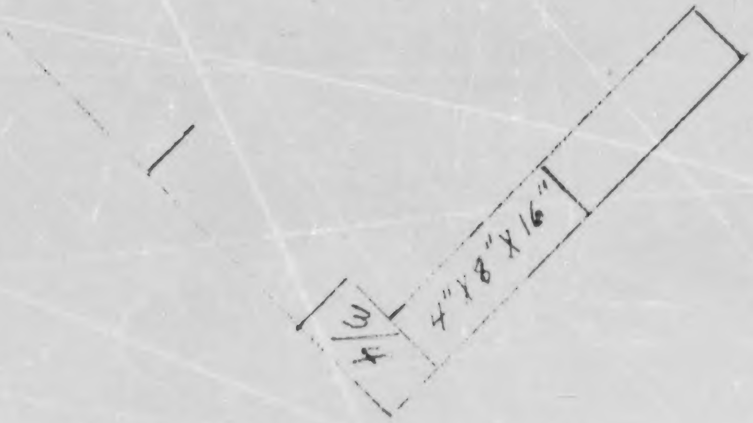
Getting easier all the time. Time and Tide wait for no man, so get on to a new task package.

Figure 1

4" CONCRETE BLOCK VENEER WALL



2ND COURSE PLAN



1ST COURSE PLAN

UNIT XI: CONSTRUCTION OF BRICK AND BLOCK VENEER WALLS

TASK PACKAGE 3: LAYING UP A BRICK VENEER WALL, IN STRETCHER BOND, USING THE CORNER POLE SYSTEM

PREREQUISITES: UNIT XI, TASK PACKAGE 1

RATIONALE:

Relax - and let this task package lead you around another corner to new masonry skills. You'll find the corner pole is helpful to you in laying brick to the line.

The brick veneer wall is part of this task package and is not relegated to a minor role, but here the corner-pole system comes into being. The corner pole was developed to eliminate the necessity of building corner leads before the brick course was laid. With the corner pole, all the brick on a course can be laid to the line without first building corner leads. The corner pole properly laid out will give complete uniformity of bed joints from floor to top of wall, which gives a stronger wall. A great benefit is the extra number of brick that can be laid in a given length of time by not building corner leads. The corner pole is adaptable to solid brick walls as well as brick veneer.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a brick veneer wall, in stretcher bond, using the corner pole system maintaining the following standards:

a. set-up corner poles.

b. plumb corner pole ± 1/8".

c. ± 1/8" for overall height for a given number of courses and wall height.

d. all brick laid to the line.

e. 3/8" to 1/2" mortar space for head joints.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XI-3, a super feature.
2. Read Bricklaying Vocational Training, page 9, section Corner Pole or Masonry Guide. Note the fact that the average skilled bricklayer can lay at least five brick to the line in the time it takes him to lay, plumb, and level one brick in a corner lead.
3. View figure one in this task package and note one type of corner pole in use.
4. Read Masonry Simplified, Volume II, pages 363-365, section Veneered Walls.

LEARNING ACTIVITY (cont'd):

5. Proceed to Learning Practice with determination to lay it to the line.

LEARNING PRACTICE:

Tools and Equipment

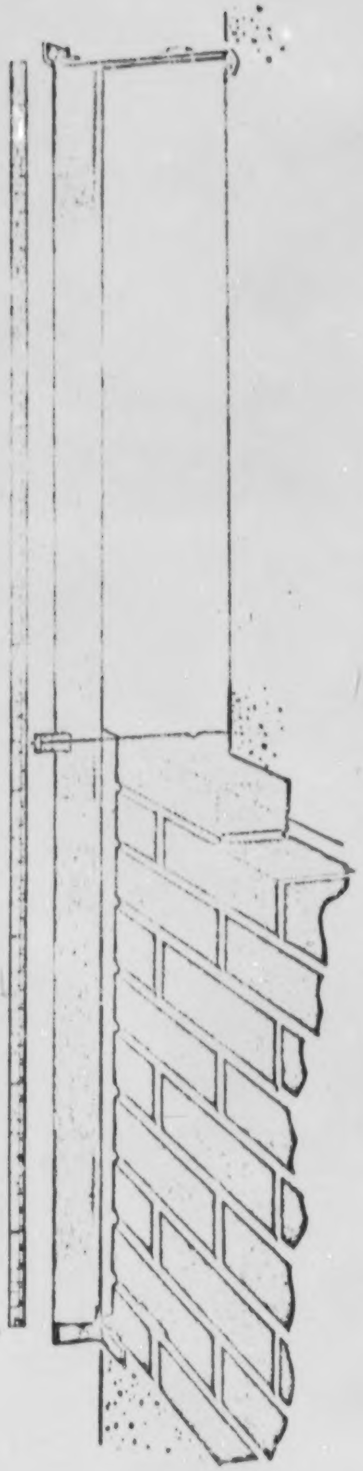
1. Trowel
2. Corner poles
3. 6' standard spacing rule
4. Mason's line
5. Corner blocks
6. Mortar board
7. Brick
8. Level

1. Check with your instructor for the height of the wall; determine the brick course spacing for the wall height ± 1/8".
2. Set up corner poles at the corners ± 1/8" for plumb. (Consult with your instructor for information before going to the next step.)
3. Mark off the corner poles using the 6' standard spacing rule (number 1 step) and a pencil. Reference from the floor to the height of a given wall.
4. Stretch mason's line on the markings between poles, attaching with the use of corner blocks.
5. Lay the brick to the line (no need to build leads) maintaining 3/8" to 1/2" head joints. When the course is filled in, raise line to next marking on the pole and continue laying up the wall to the given height.

LEARNING PRACTICE (cont'd):

In task package XI-1 you found that building a corner using the plumb line was simpler and faster than the method of completely plumbing and leveling a corner lead with the plumb rule. Now what are your opinions? You are one of the new breed that has the opportunity to work with corner poles, and the future of the corner pole is now.

A career in masonry can provide you with an exciting future. Take advantage while you can.



CORNER POLE

Figure 1

UNIT XI: CONSTRUCTION OF BRICK AND BLOCK VENEER WALLS

TASK PACKAGE 4: LAYING A BRICK VENEER WALL AT A WOODEN DOOR JAMB

PREREQUISITES: UNIT XI, TASK PACKAGE 2

RATIONALE:

Don't jam yourself against the wooden door! Just lay up a neat wall around the wooden door jamb, and enter the door to further masonry skills.

Unfortunately, all brick walls are not without openings. This task package deals with laying up a wall around a wooden door jamb. Since we need door openings to enter most structures, it is necessary to place the brick around the jamb properly. Building up the brick of the two sides of the door jamb uniformly to the top of the door is a matter of proper course layout. It is also important to cut brick neatly for the wall in order to maintain the same size piece from base to top of the door.

Continue now by reading the Objective and doing the Learning Activity and Learning Practice, referring back to the Objective as often as necessary.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a veneer brick wall at a wooden door jamb location maintaining the following standards:

a. + 1/4" for overall wall height for a given number of courses.

b. 3/8" to 1/2" mortar space for head joints.

c. all brick laid to the line.

d. install metal wall ties.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XI-4, the cat's whiskers.
2. Look at figure 1 in this task package, observing at points (A) and (B) how the top of the brick meets the top of the door jamb in unit 2. Observe how the brick are placed at the door jamb so as not to have an open space.
3. Proceed with the Learning Practice, unless you have questions regarding the Objective. Discuss them with your instructor.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Brick hammer
4. 6' standard spacing rule
5. Mason's line
6. Corner blocks
7. Mortar board
8. Brick
9. 6d or 8d common nails
10. Metal wall ties

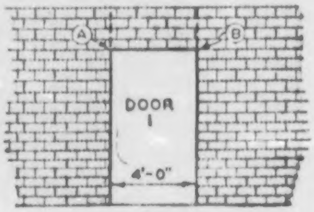
1. The height of the wall will correspond to the height of the door jamb to + 1/4": determine the brick course spacing for the wall height.
2. Using the corner poles, mark off the poles from your 6' spacing rule and stretch the line between poles on the marks.
3. Lay out dry the first brick course the total length of the wall so as not to have a bat in the wall over the door.
4. Lay brick to the line, cutting the brick with the brick hammer or brick set (consult instructor for cutting demonstration) at the door jamb. Keep the brick tight to the brick molding on the jamb and maintain the 3/8" to 1/2" head joints on all courses.
5. After each course is completed, raise the line to the next mark on the corner pole and fill in the brick to the height of the wall.
6. Properly position metal wall ties every 7 to 9 courses and nail metal wall ties to every stud horizontally.

LEARNING PRACTICE (cont'd):

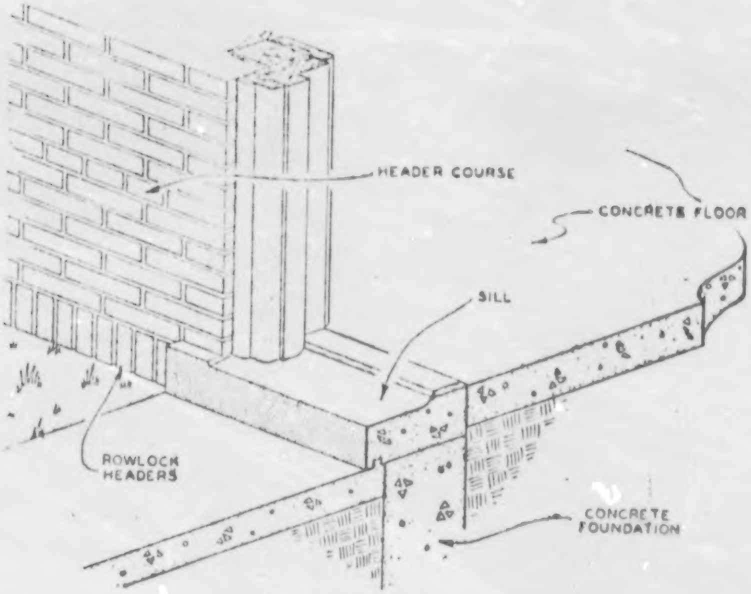
7. Use scaffolding where necessary.

Doing these task packages is like finding gold, for at the end of your training period you can pan as much as you desire.

WOODEN DOOR FRAME IN BRICK WALL



2


HEADER COURSE
CONCRETE FLOOR
SILL
ROWLOCK
HEADERS
CONCRETE
FOUNDATION

DOOR FRAME IN BRICK WALL

1

Figure 1

BM-XI-5

UNIT XI: CONSTRUCTION OF BRICK AND BLOCK VENEER WALLS

TASK PACKAGE 5: LAYING UP A BRICK VENEER WALL AT A WINDOW JAMB LOCATION

PREREQUISITES: UNIT XI, TASK PACKAGES 1, 3, and 4

RATIONALE:

Don't jam yourself in the window here. Just lay up a brick veneer wall at a window jamb location, and open a window on new masonry skills.

There are many varieties of windows from the viewpoint of size, shape and material, such as steel, aluminum, and wood. In this task package we will work with a wood window properly set in the frame wall opening. As far as the mason is concerned when laying a brick wall around the window, the window has three principal parts: the head, jamb, and sill. The head is the horizontal top of the window, the jambs are the vertical sides, and the sill is the horizontal bottom. In laying out the overall height of the wall, the mason must consider the distance under the window to allow 4 1/2" to 4 3/4" for a slanted rowlock sill or 2 5/8" to 2 7/8" for a header sill. He must then consider the distance from where the brick will bear to, to the head of the window. The brick must be laid tight to the brick mold at the window jamb to keep air from passing in through the frame wall.

RATIONALE (cont'd):

In this task package you will be given the opportunity to lay up a brick veneer wall at a window jamb location. Now proceed with full speed ahead.

OBJECTIVE:

Upon completion of this task package you will be able to lay up a brick veneer wall at a window jamb location, maintaining the following standards:

a. + 1/4" for overall height for a given number of courses and wall height.

b. 3/8" to 1/2" mortar space for head joints.

c. all brick laid to the line.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XI-5, a scrumptious show.
2. Read Masonry Simplified, Volume I, page 247, section Laying Units Around Window, and page 281, Window and Door Details and Brick Veneer Details.
3. View figure 1 in this task package for brick details around the window at the window jamb.

LEARNING ACTIVITY (cont'd):

4. Proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Brick hammer
4. 6' standard spacing rule
5. Mason's line
6. Corner blocks
7. Mortar board
8. Brick
9. 6d or 8d common nails
10. Metal wall ties
11. Window frame

1. The height of the wall will correspond to the height of the window jamb to + 1/4"; determine the brick course spacing for the wall height.
2. Using the established corner poles, mark off the poles from your 6' spacing rule and stretch the line between poles on the marks.
3. Maintaining 3/8" to 1/2" head joints, lay all brick in to the line, cutting the brick at the window jamb.
4. Use scaffolding where necessary and observe all safety regulations.

Clean up your working area and tools, placing the tools in the toolroom.

Do you know why the hen stopped in the middle of the super highway? So she could lay it to the line - just as you are doing.

WALL SECTION AT WINDOW JAMB

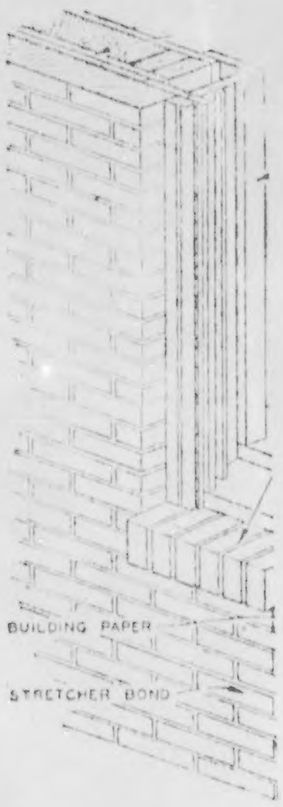

BUILDING PAPER
STRETCHER BOND

Figure 1

UNIT XI: CONSTRUCTION OF BRICK AND BLOCK VENEER WALLS

TASK PACKAGE 6: INSTALL LINTELS, BRICK SILLS AND LAY UP BRICK WALL ABOVE WINDOW OR DOOR

PREREQUISITES: UNIT XI, TASK PACKAGE 3

RATIONALE:

You know that one of the rarest plays in baseball is a triple play. Well, here in your hand is a rare package, for it calls for triple action.

In this task package you will pull the triple hat trick: installing a lintel and a brick window sill, and laying brick above the window opening. The lintel is a length of steel angle iron set over the window opening to support the brick work above. Other types of lintels are of stone, precast concrete, wood and other patterns in steel. The brick window sill is constructed similar to the rowlock coping on top of a retaining wall, except it is on a slope to allow the rain water to run off. To complete the wall section above the window you will need to build a scaffold.

Now that you have an idea as to what you are going to do, read carefully the Objective and proceed with Learning Activity and Learning Practice.

OBJECTIVES

Upon completion of this task package you will be able to install a lintel over a window or a door to support the brick work above, and install a brick window sill maintaining the following standards:

a. Installation of lintel above a window or a door acccording to building code specification.

b. 3/8" to 1/2" mortar space for head joints.

c. ± 1/8" for overall height for a given number of courses and wall height.

d. all brick laid to the line above window and door openings.

e. whole rowlock or header brick properly spaced to window opening.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package EM-XI-6.
2. View figure 1 in this task package to see the lintel placed over a window opening.
3. View figure 2 in this task package to see the placement of brick in a rowlock sill.

LEARNING ACTIVITY (cont'd):

4. Read Masonry Simplified, Volume II, pages 170 through 179, sections on Theory of Lintels and Kinds of Lintels.

5. Read Masonry Simplified, Volume I, pages 281 and 283, section on Window and Door Details. Observe (A) in figure 20, page 283 to see the [illegible] projection of the bottom edge of brick beyond the face and top edge of the brick under the wooden sill of the window frame.

6. Proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Brick hammer
4. 6' standard spacing rule
5. Mason's line
6. Corner blocks
7. Mortar board
8. Brick
9. 6d or 8d common nails
10. Metal wall ties
11. Steel lintel

1. Check with your instructor for the height of the wall; determine the brick course spacing for the wall height.

2. View figure 1 in this task package for the method of placing a lintel over a window or door, and place the lintel as shown on your work.

3. Lay up the brick wall above lintel to the line maintaining 3/8" to 1/2" head joints for the given height ± 1/8".

LEARNING PRACTICE (cont'd):

4. View figure 2 of this task package for the position of brick in a rowlock sill. The header window sill is installed similarly, to the brick position you learned about in Unit VI-1.

5. Use the brick spacing rule to determine the head joints' spacings for the sill; allow one extra head joint in the overall width of window sill opening. It is a good practice to mark off the spacings on the existing brick work and then observe your marks. Most masonry buildings require brick sills under the windows, so this is another area where you must develop skill. We'll depend upon you, and congratulations on a job well done.

Brick by brick the structure rises; step by step your skills increase.

BRICK WINDOW SILL

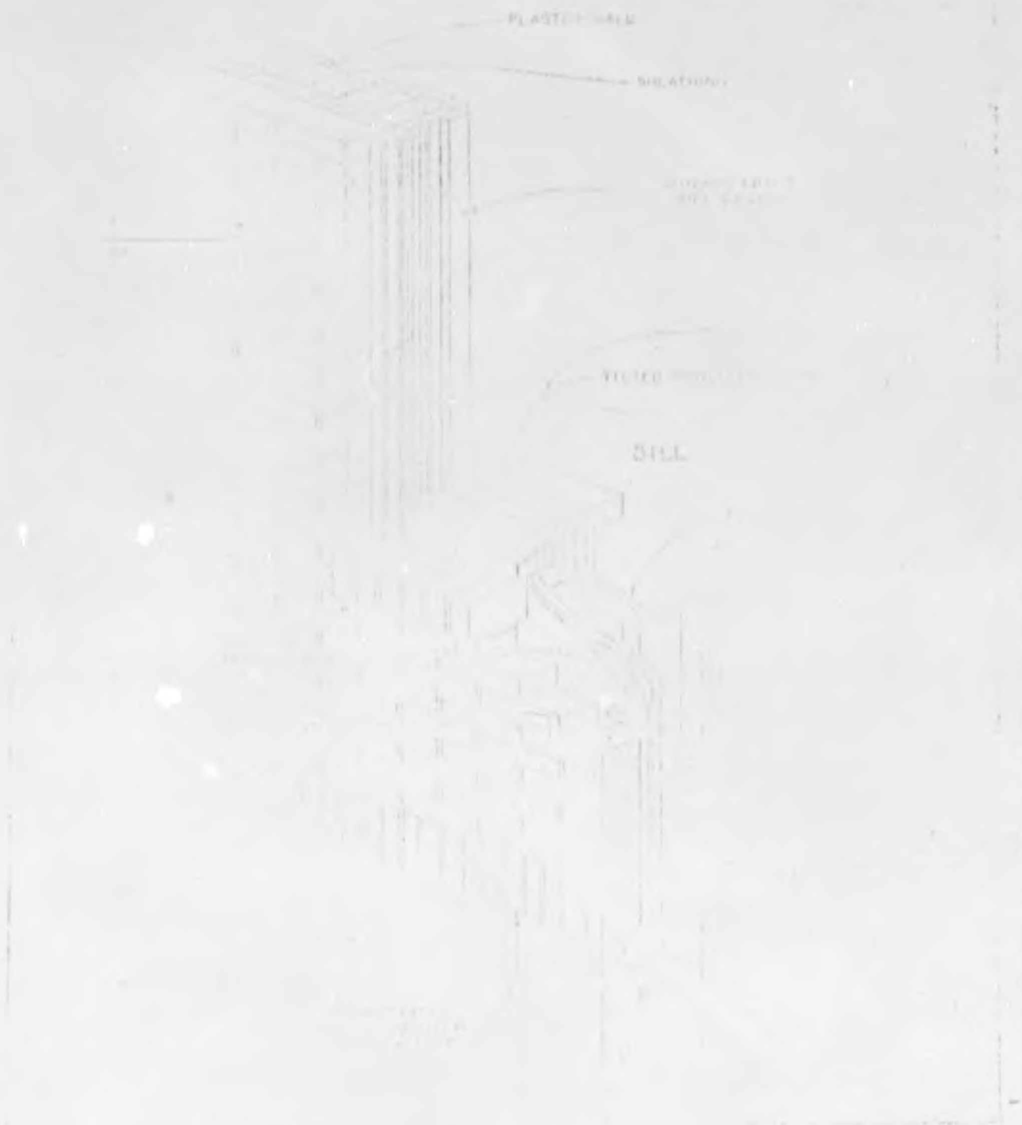
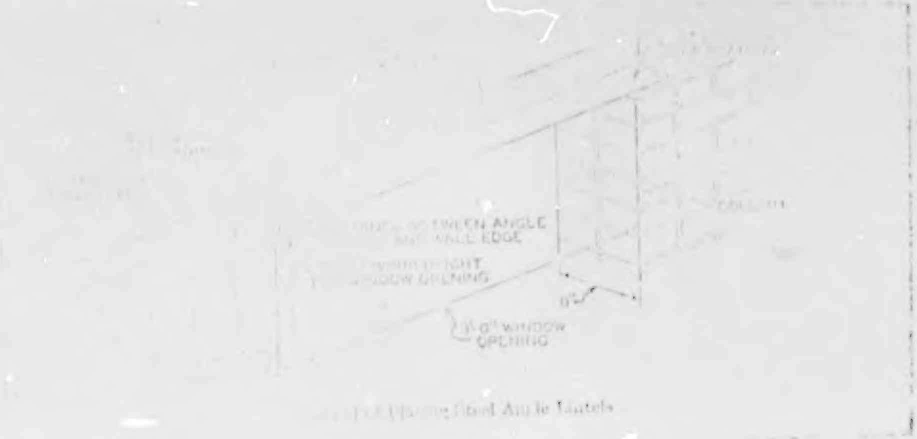

PLASTER WALL
SHEATHING
TILTED
SILL

Figure 2

BEST COPY AVAILABLE

METHOD OF PLACING STEEL LINTEL


BETWEEN ANGLE
AND WALL EDGE
WINDOW OPENING
6"
WINDOW
OPENING

[illegible] Placing Steel Angle Lintels

Figure 1

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UNIT XI: CONSTRUCTION OF BRICK VENEER AND BLOCK WALLS

TASK PACKAGE 7: LAYING A BLOCK VENEER USING CORNER POLE SYSTEM

PREREQUISITES: UNIT I, TASK PACKAGES 1-7; UNIT III, TASK PACKAGE 1;
UNIT VIII, TASK PACKAGE 2; UNIT XI, TASK PACKAGE 3

RATIONALE:

The concrete block is here to stay - at least for a while. Structures of this building unit stay around for quite a while. You will see the reasons for its wide use in this package.

The construction of 4" block veneer walls properly designed and built will satisfy varied building requirements, including fire protection, safety, durability, economy, appearance, utility, comfort, and good acoustics.

The concrete block has in the last 25 years become one of the most used of the masonry materials; it is reported that over 50% of all masonry wall construction today is laid up with concrete masonry. The concrete block is not a burned material, such as brick or structural tile, but a material pressed into forms and then steam cured to speed up the time between forming and delivery of the product to the job.

In order to familiarize yourself with this versatile and practical building unit, proceed by reading the Objective and then doing the Learning Activity and Learning Practice.

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OBJECTIVE:

Upon completion of this task package you will be able to lay up a block veneer wall using the corner pole system maintaining the following:

a. proper setup of corner poles.

b. plumb corner poles ± 1/8".

c. ± 1/8" for overall height for a given number of courses and wall height.

d. all block laid to the line.

e. 5/16" to 7/16" mortar space for head joints.

f. install metal ties.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XI-7, featuring Mr. Concrete Block.
2. Read Masonry Simplified, Volume I, page 156, section on Typical Concrete Masonry Construction Details. Observe what it has to say about good construction and good appearance of the block work.
3. In task package 2 of Unit XI, you read an article in Bricklaying Vocational Training about corner poles. If need be, return to the article on page 9 for review.

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LEARNING ACTIVITY (cont'd):

4. This completes the Learning Activity. Proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Corner poles
3. 6' modular rule
4. Mason's line
5. Corner blocks
6. Mortar board
7. 4" x 8" x 16" block
8. Level
9. 6d or 8d common nails
10. Metal wall ties

1. Check with your instructor for the height of the wall; determine the block course spacing for the wall height.
2. Set up corner poles as in task package 3, Unit XI.
3. Mark off corner poles using 6' modular rule.
4. Each course uses a 3/4" length block at corner as in task package 2, Unit XI.
5. Stretch mason's line between corner poles and lay block to the line, maintaining 5/16" to 7/16" head joints to the given height + 1/8".
6. Position and nail wall ties to the studs every 7 courses in elevation. Clean up your tools and the work area.

You're coursing along smoothly to a career in masonry.

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RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: MASONRY
COURSE: BRICKLAYING

CE 039352 (L)

UNIT XII: CONSTRUCTION OF AN 8" BRICK WALL SECTION WITH WINDOW INSTALLATION

PREREQUISITES: UNIT VII, TASK PACKAGE 7; UNIT VI, TASK PACKAGES 3, 5, and 6

RATIONALE:

Man has depended upon masonry walls to protect himself and his family for many generations. Even though most masonry walls have a distinct beauty about them, they are enhanced with the placement of windows in them. So much for the windows, as you will be more concerned with the construction of a wall section of a composite wall to encase a window frame by building the brick section below the window, the pier on both sides of the window frame, installing the lintel and doing the brick work above the window, then setting the brick window sill in place. Continue now by reading the General Objectives for the unit and the Specific Objectives for the individual packages. Go on to the Learning Activity, which will supply the information of what you are to do and how you are going to do it.

OBJECTIVE:

General:

Upon completion of this unit package you will be able to construct a brick wall section with a window installation.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Lay up an 8" brick wall in common bond, below window opening, using established leads and maintaining the following standards:
    a. 3/8" to 1/2" mortar space for head joints.
    b. ± 1/8" for overall height for a given number of courses and wall height.
    c. all brick laid to a line.

    Your performance will be evaluated in accordance with the instructor's checklist.
2. Set a window frame and lay up 8" brick piers in common bond to form a window opening, maintaining the following standards:
    a. set window plumb ± 1/16" and level ± 1/16".
    b. 3/8" to 1/2" mortar space for head joints.
    c. ± 1/4" for overall height for a given number of courses and wall height.
    d. all brick laid to a line.
    e. erect proper scaffolding.

    Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

3. Install a lintel, brick window sill, and lay up an 8" brick wall in common bond above window opening, maintaining the following standards:
   a. position lintel above window.
   b. 3/8" to 1/2" mortar space for head joints.
   c. ± 1/8" for overall height for a given number of courses and wall height.
   d. all window sill brick to be checked for level ± 1/8" and alignment with level.
   e. ± 1/8" for overall width for a given number of brick for window sill.
   f. brick above lintel to be laid to the line.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This is another of the units that must be completed in numerical order for the package. In the task packages of the unit you are to view a sound-slide program, read assignments, and construct the walls in the three task packages. The task packages contained in this unit are:

TASK PACKAGE 1: LAYING AN 8" COMMON BOND WALL BELOW A WINDOW

TASK PACKAGE 2: LAYING UP 8" COMMON BONDED BRICK PIERS TO FORM A WINDOW OPENING

TASK PACKAGE 3: INSTALLING A LINTEL, BRICK WINDOW SILL, AND LAYING AN 8" COMMON BONDED BRICK WALL ABOVE WINDOW

Upon completion of the Learning Activity, if you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT XII: CONSTRUCTION OF AN 8" BRICK WALL SECTION WITH WINDOW INSTALLATION

TASK PACKAGE 1: LAYING AN 8" COMMON BOND WALL BELOW A WINDOW

PREREQUISITES: UNIT VII, TASK PACKAGE 7; UNIT XI, TASK PACKAGE 3

RATIONALE:

Windows serve both useful and artistic purposes. Some windows serve for ventilation and lighting; others for decoration. The mason needs to know how to lay up an 8" common bond wall below either type of window.

If you drive to one of these new, modern industrial plants in your town, you will see very few if any windows, other than the entrances, built into the walls. But in stores, office buildings or other light commercial buildings, windows are an esthetic part of the walls. The bricklayer must know how to lay out his wall in order for the brick sills to be properly installed, and so that the brick works out to the head of the window. It is easier to plan your proper brick layout than to cut brick the entire height of the wall. Haste makes waste, so do your planning before beginning construction of your wall; then get with it.

OBJECTIVE:

Upon completion of this task package you will be able to lay up an 8" brick wall in common bond, below a window opening, using established leads and maintaining the following standards:

a. 3/8" to 1/2" mortar space for head joints.

b. ± 1/8" for overall height for a given number of courses and wall height.

c. all brick laid to a line.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XIII-1, starring James Common Bond.
2. Read Masonry Simplified, Volume II, pages 327 through 329. Study figure 12 on page 329.
3. Read Bricklaying Vocational Training, page 37.
4. This completes the Learning Activity; begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. "Carpenter's" square
3. Brick hammer
4. Mortar [illegible]
5. Mortar board
6. Brick
7. Mason's line
8. Window frame

1. Check with your instructor for the length and height of the wall; determine the brick course spacing needed for given height of the wall ± 1/8".

2. Written material and illustrations found in Masonry Simplified, Volume II, pages 327-339, and Bricklaying Vocational Training, page 27, will serve as the standards to use in the construction of the 8" common bond wall below window placement.

3. With the experience gained in past task packages, dry lay out the first course of brick eliminating less than a half brick in the wall. Review task package 7 in Unit VII if necessary.

4. Lay up the 8" common brick wall maintaining 3/8" to 1/2" head joints and the given height of the wall ± 1/8", laying all brick to the line.

5. When you have completed the wall to its given height, have the instructor evaluate it. Do not demolish this wall as you will be building on top for window piers in the next task package.

UNIT VII: CONSTRUCTION OF AN 8" BRICK WALL SECTION WITH WINDOW INSTALLATION

TASK PACKAGE 2: LAYING UP 8" COMMON BONDED BRICK PIERS TO FORM A WINDOW OPENING

PREREQUISITE: UNIT XI, TASK PACKAGE 5

RATIONALE:

Don't peer out the open window. Focus your attention on brick piers to form a window opening. They are discussed right here.

In this task package you will discover that working around a window frame for an 8" brick wall is a good deal different from what was accomplished in Unit XI, task package 5, where the window was installed by a carpenter in a permanent setting and you worked to the set window. Now you will use one of several other methods of building piers for the window jamb openings.

These methods are important to the mason in construction work because plans and specifications often call for varying practices. You will find that the more versatile the mason, the greater the demand for his work.

OBJECTIVE:

Upon completion of this task package you will be able to set a window frame and lay up 8" brick piers in common bond to form a window opening maintaining the following standards:

a. set window plumb ± 1/16" and level ± 1/16".

b. 3/8" to 1/2" mortar space for head joints.

c. ± 1/8" for overall height for a given number of courses and wall height.

d. all brick laid to a line.

e. erect proper scaffolding.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XII-2, and peer at it closely.
2. Read Masonry Simplified, Volume I, pages 281-283. Study figure 20 part (A) on page 283.
3. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Brick hammer
3. 8" standard spacing rule
4. Mason's line
5. Level
6. Corner block
7. Mortar board
8. Brick
9. Window frame

1. Check with the instructor on the manner of setting the window frame into position plumb + 1/16" and level ± 1/16".
2. Check the height of the window frame, plus the essential distance for the brick sill, and determine the brick course spacing for the height + 1/4" of the 8" common bonded brick piers that form the window opening. The length of the established wall, less the width of the window, will be the two brick pier widths.
3. Construct the two brick piers, laying to the line the height + 1/4" of the window plus brick window sill.
4. Erect proper scaffolding to make your work more comfortable - less dangerous.

One more task package and you will have a full story high wall. Get on with it, for this is only half a loaf.

You're going to be outstanding as a mason among your peers.

UNIT XII: CONSTRUCTION OF AN 8" BRICK WALL SECTION WITH WINDOW INSTALLATION

TASK PACKAGE 3: INSTALLING A LINTEL, BRICK WINDOW SILL, AND LAYING AN 8" COMMON BONDED BRICK WALL ABOVE WINDOW

PREREQUISITES: UNIT VII, TASK PACKAGE 7; UNIT XI, TASK PACKAGE 6

RATIONALE:

Did you ever think that Triassic Shale would be used so extensively in construction? Well, it makes beautiful brick for building. Consider its use here for the projects in this package.

Brick can be and are used for many structural purposes, including all kinds of walls. In this task package you will be confronted with laying an 8" common bonded wall section above a window. This is not much different from building the section below the window, except for the height off the floor and a means of supporting the brick above the window opening. You eliminate the height problem by properly erecting a scaffold and working from it. The supporting of the brick above will be taken care of by correctly installing two metal angle irons as lintels. The brick sill is to be installed as in the previous unit. The degree of difficulty has been decreased by the learning factor of knowing what to do. When you become a skilled mason, you can be like James Bond - one of the best in your vocation.

OBJECTIVE:

Upon completion of this task package you will be able to install a lintel, brick window sill, and lay up an 8" brick wall in common bond above a window opening, maintaining the following standards:

a. position lintel above window. .

b. 3/8" to 1/2" mortar space for head joints.

c. ± 1/8" for overall height for a given number of courses and wall height.

d. all window sill brick to be checked for level ± 1/8" and alignment with level.

e. ± 1/8" for overall width for a given number of brick for window sill.

f. brick above lintel to be laid to the line.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XII-3, starring James Common Bond's grandfather.

2. Read Masonry Simplified, Volume II, pages 188-189. Observe the method of placing steel lintels over window openings. Study

LEARNING ACTIVITY (cont'd):

figure 9 on page 326, observing the brick work above the windows to the height of the total wall.

3. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. 6' standard spacing rule
3. Brick hammer
4. Mason's line
5. Corner block
6. Mortar board
7. Brick
8. Scaffold

1. Check with your instructor for height of wall; determine the brick course spacing for the wall height ± 1/8".
2. Install lintels and brick window sill as in task package 6 of Unit XI.
3. Lay up the 8" common bonded wall to the given height ± 1/8".
4. All brick above the lintel to be laid to the line, maintaining 3/8" to 1/2" head joints.

Continue to blend together hard work and enthusiasm as you dive off into another task package, after having this one checked by the instructor.

Bond by bond, you're building toward a career in masonry.

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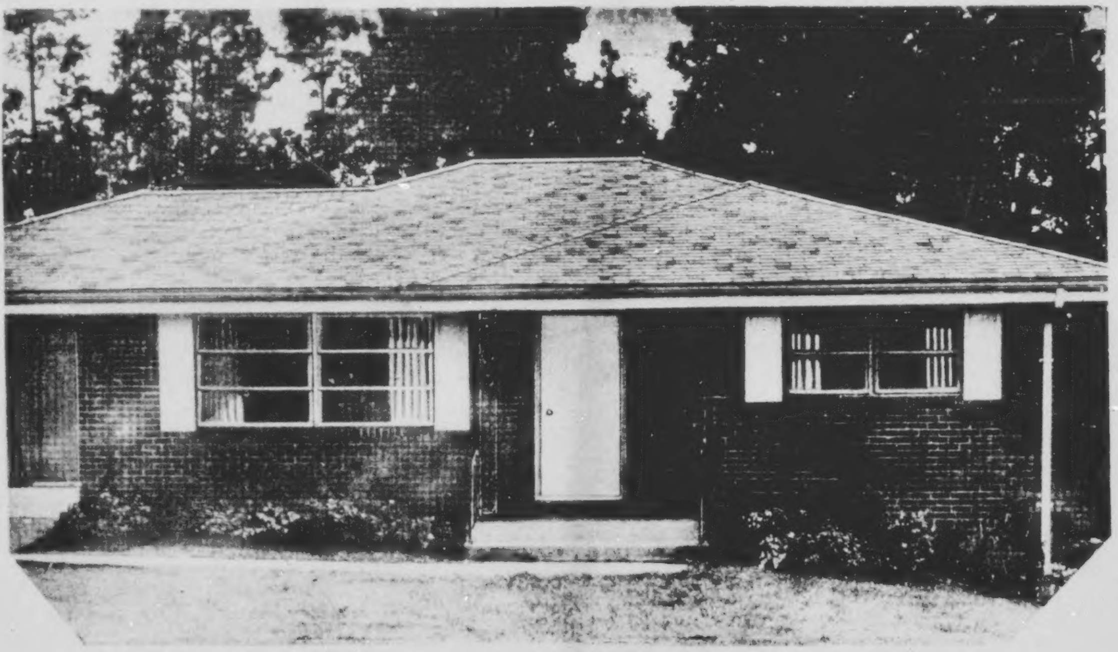


CLUSTER: MASONRY
COURSE: BRICKLAYING

CE 039332 (ms)

UNIT XIII: BUILDING AN 8" BRICK WALL SECTION WITH STEEL DOOR JAMB INSTALLATION

PREREQUISITES: UNIT VII, TASK PACKAGE 3; UNIT XII, TASK PACKAGE 2

RATIONALE:

You will be walking through the door of a new learning experience as you construct an 8" stretcher bonded brick wall at a steel door jamb installation. The steel door frame becomes an intregal part of the brick wall as it is constructed due to the method of tying the frame to the masonry wall with steel anchors. You will be using your brick spacing rule to calculate the course spacing from the floor to the head of the door frame and from the head to the top of the wall. It will be necessary to erect a scaffold and work from the scaffold to complete the height of the total wall. Continue by reading the General Objective for the unit and the Specific Objectives for the task packages. Proceed to the Learning Activity which will supply the information of what you are to do and the proper procedure in doing it.

OBJECTIVES:

General:

Upon completion of this unit package you will be able to construct a brick wall at a steel door jamb location.

OBJECTIVES (cont'd):

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Lay up an 8" brick wall in stretcher bond to the height of the door jamb between established leads, maintaining the following standards:
    a. set door jamb plumb ± 1/16" and level ± 1/16".
    b. 3/8" to 1/2" mortar space for head joints.
    c. + 1/4" for overall wall height for a given number of courses to top of the door jamb.
    d. all brick laid to the line.
    e. erect proper scaffolding.

    Your performance will be evaluated in accordance with the instructor's checklist.
2. Install a lintel and lay up an 8" brick wall in stretcher bond, above the door lintel, maintaining the following standards:
    a. properly positon lintel above door opening.
    b. 3/8" to 1/2" mortar space for head joints.
    c. ± 1/8" for overall height for a given number of courses and wall height.
    d. all brick laid to the line.

    Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

Begin with Task Package number 1 and then do number two, for this is a short unit in terms of task packages but not in terms of experience. In the packages you will be asked to view a sound-slide package, read assignments, and construct a brick wall at a steel door installation. The task packages titles contained in the unit are:

TASK PACKAGE 1: BUILDING AN 8" STRETCHER BOND BRICK WALL TO THE HEIGHT OF A STEEL DOOR JAMB

TASK PACKAGE 2: BUILDING AN 8" STRETCHER BOND WALL ABOVE THE DOOR LINTEL

If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT XIII: BUILDING AN 8" BRICK WALL SECTION WITH STEEL DOOR JAMB INSTALLATION

TASK PACKAGE 1: BUILDING AN 8" STRETCHER BOND BRICK WALL TO THE HEIGHT OF A STEEL DOOR JAMB

PREREQUISITES: UNIT VII, TASK PACKAGE 3

RATIONALE:

In this task package you will find there are other types of door frames than the one you built brick around in another task package. You will work with a steel door jamb and its adjacent brick wall. The steel door frames are gaining in popularity with the builders, especially apartment and townhouse contractors. There is less danger of damage to the steel frames while the tradesmen are handling them, or when they are in the wall as the buildings are being completed. Another major reason for using them is that the steel door frame requires no other trim around the unit to complete the installation. The steel door frame with its counterpart, the steel door, forms the most burglar proof of all door units. The door frame is attached to the 8" brick wall by the means of steel anchors, supplied by the door-frame manufacturer, placed at three exact positions along the door jamb section of the door frame.

OBJECTIVE:

Upon completion of this task package you will be able to lay up an 8" brick wall in stretcher bond to the height of the door jamb between established leads, maintaining the following standards:

a. 3/8" to 1/2" mortar space for head joints.

b. + 1/4" - 0 for overall wall height for a given number of courses to top of door jamb.

c. all brick laid to the line.

d. erect proper scaffolding.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XIII-1, a burglar-proof production.
2. View figure 1 in this task package to observe the brick at the head of the door. It is not below the head, but is even or could be 1/4" above.
3. Observe the lintel placement on page 189, Masonry Simplified, Volume II.
4. Read Masonry Simplified, Volume II, page 365, Opening in Masonry Walls. Masonry Simplified, Volume I, Window and Door Details.
5. Proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Brick hammer
4. 6' standard spacing rule
5. Mason's line
6. Corner blocks
7. Mortar board
8. Brick
9. Metal wall ties
10. Door frame

1. Check with your instructor for information regarding the steel door jamb.
2. The height of the wall + 1/4" will correspond to the height of the door jamb. Determine the brick course spacing for the wall height.
3. Using established leads, maintain correct course spacing and stretch line between leads to the height of the course.
4. Using 3/8" to 1/2" head joints, lay all brick to the line, cutting the brick at the door jamb where necessary.
5. Embed metal wall ties in proper position. Check with the instructor for the door jamb metal ties.
6. It will be necessary to use scaffolding, so install it properly and follow all safety procedures. Leave this project erected; you will use this setup in the next task package.

After all this practice of laying to a line, you should be a good candidate for the TV show "What's My Line." You did a jamb-up good job with this package.

STEEL DOOR JAMB INSTALLATION

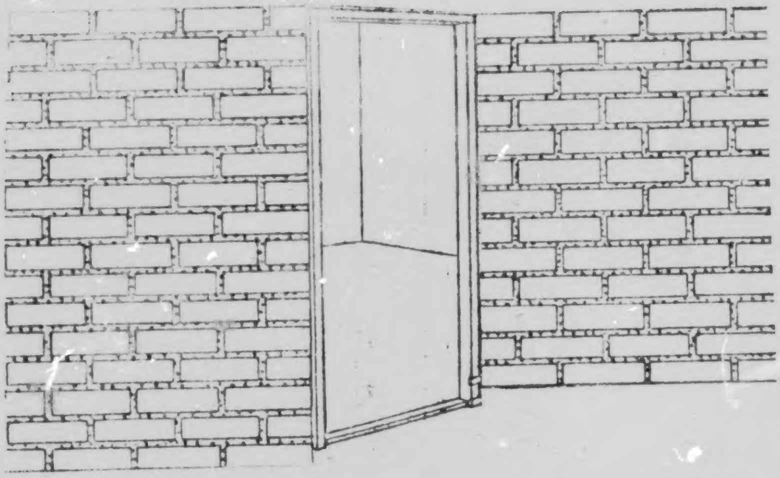


Figure 1

UNIT XIII: BUILDING AN 8" BRICK WALL SECTION WITH STEEL DOOR JAMB INSTALLATION

TASK PACKAGE 2: BUILDING AN 8" STRETCHER BOND WALL ABOVE THE DOOR LINTEL

PREREQUISITES: UNIT VII, TASK PACKAGE 3; UNIT XII, TASK PACKAGE 2

RATIONALE:

Stretch up to reach a higher level with an 8" stretcher bond wall above the door lintel. It will take some stretching, but you're the one to build this wall.

This is a continuing explanation of the previous task package. The unit consists of an 8" brick wall section with steel door jamb installation. When you completed the last task package, you had built only approximately 2/3rds of the total height of the wall section, so, with your second wind, you should be able to finish the task without too much difficulty. Using the same drive you have shown so far - get with it and do it. Didn't I hear you say you want to go to higher heights?

OBJECTIVE:

Upon completion of this task package you will be able to install a lintel and lay up an 8" brick wall in stretcher bond above the door lintel maintaining the following standards:

a. properly position lintel above door opening.

b. 3/8" to 1/2" mortar space for head joints.

c. ± 1/8" for overall height for a given number of courses and wall height.

d. all brick laid to the line.

Your performance will be evaluated according to the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XIII-2, starring James Common Bond's tall sister.
2. Review Unit XI, Task Package 6, and Unit XII, Task Package 3, for the proper procedure of setting the angle-iron lintels above door opening.
3. Proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Trowel
2. Level
3. Brick hammer
4. 6' standard spacing rule
5. Mason's line
6. Corner blocks
7. Mortar board
8. Brick
9. Metal wall ties
10. Lintels

1. Check with your instructor for the height of the wall above the door opening of previous task packages; determine the brick course spacing for the height of the wall.

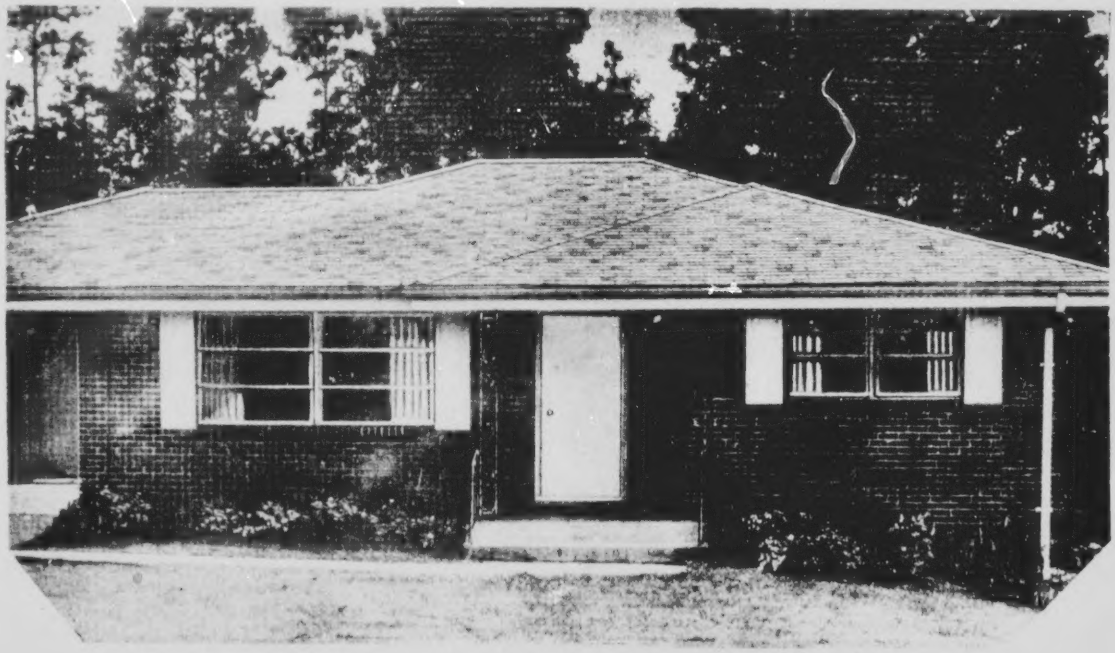
2. Stretch the mason line between established leads, using the correct course spacing, and lay up the 8" brick wall after properly positioning the two angle-iron lintels above the door opening.

3. Lay all brick to the line, maintaining 3/8" to 1/2" head joints to the given height ± 1/8" of the wall.

You have now reached a new height in your learning experience, and you have done exceptionally well. Congratulations on a job well done.

It looks as if you're going to beat James Common Bond at his own game.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330



CLUSTER: MASONRY
COURSE: BRICKLAYING

CE003932(72)

UNIT XIV: ESTIMATING MASONRY MATERIAL FOR A GIVEN WALL

PREREQUISITES: UNIT I, TASK PACKAGES 3 and 4; UNIT V, TASK PACKAGE 2;
UNIT XIV, TASK PACKAGES 2 and 3

RATIONALE:

Once you have reached the height of being what is known as a journeyman in the trade, you will have passed through a period of the keenest competition and an inward struggle. Upon becoming a journeyman, competition decreases and opportunity increases, to those who have taken advantage of knowledge. Knowledge pays dividends. Many journeymen will never advance any higher than the journeyman, because of their inability to estimate quantities of material, read plans and understand the specifications of masonry. This task package will prepare you to be able to calculate quantities of materials for masonry walls. So prepare for the time when opportunity will knock. Be ready!

Continue by reading the General Objective for the unit and the Specific Objectives for the individual task packages; proceed to the Learning Activity, which will furnish the information of what you are to accomplish and the proper procedures for doing it.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to estimate quantities of material needed to construct a masonry wall (s).

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Calculate in writing the quantity of brick needed to construct five different types of walls, given the length, width and height of each.
    a. single wythe of wall, using standard brick in stretcher bond.
    b. single wythe of wall, using engineer's brick in stretcher bond.
    c. two wythes of wall, using standard brick in common bond.
    d. single wythe of wall using Roman brick in stretcher bond.
    e. single wythe of wall, using standard brick in Flemish bond.

    Your work will be evaluated according to the instructor's checklist.
2. Calculate in writing, the quantity of mortar needed to construct a brick wall, given the length, width, height and mortar joint thickness. Your performance will be evaluated in accordance with the instructor's checklist.
3. Calculate in writing the quantity of masonry cement needed to construct a brick wall, given the length, width, height and mortar joint thickness. Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

4. Calculate in writing the quantity of sand needed to construct a brick wall, given the length, width, height and mortar joint thickness. Your performance will be evaluated in accordance with the instructor's checklist.

5. Calculate in writing the quantity of block needed to construct three different types of walls, given the length, width, and height of each.

    a. single wythe wall, using stretcher bond.

    b. cavity wall, using stretcher bond.

    c. foundation wall, using stretcher bond.

    Your performance will [illegible] evaluated in accordance with the instructor's checklist.

6. Calculate in writing the quantity of metal wall ties needed in the construction of four different types of walls, given the length, width and height of each.

    a. 8" solid brick wall, using z-bar metal ties.

    b. brick cavity wall, using rectangular metal ties.

    c. brick veneer wall, using corrugated metal ties.

    d. 12" composite wall, using continuous metal ties (durawall).

    Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

To complete this unit successfully, you must begin with task package 1 and in numerical order, complete 2, 3 and 4 because each one is prerequisite to the next one in turn. Packages 5 and 6 may be completed in any order. There are six task packages in the unit. In the packages you are to view a sound-slide presentation, read assignments and calculate the quantity of materials necessary to construct various types of walls. The task package titles in this unit are:

TASK PACKAGE 1: CALCULATING BRICK QUANTITIES.
TASK PACKAGE 2: CALCULATING AMOUNT OF MORTAR.
TASK PACKAGE 3: CALCULATING AMOUNT OF MORTAR CEMENT.
TASK PACKAGE 4: CALCULATING QUANTITY OF SAND.
TASK PACKAGE 5: CALCULATING BLOCK QUANTITIES.
TASK PACKAGE 6: CALCULATING METAL WALL TIES.

If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT XIV: ESTIMATING MASONRY MATERIAL FOR A GIVEN WALL

TASK PACKAGE 1: CALCULATING BRICK QUANTITY

PREREQUISITES: UNIT I, TASK PACKAGE 3

RATIONALE:

A good estimator makes a good mason - if the estimator is a mason who knows his brick quantities. Ability in estimating saves both time and money, as you'll see in this package.

Estimating material quantities for building a brick wall is as important as using a map to plan the route in taking a trip to an unfamiliar place. Good planning eliminates the loss of time and money. It is necessary, therefore, to be able to calculate the quantity of brick for a given wall before the wall can be constructed for several reasons. Oftentimes brick masons take someone's calculation for estimating the quantity of brick and end up with an incorrect quantity, which results in higher costs and a loss of time. Eliminate this error by learning how to calculate the quantity of brick. This package will give you the opportunity to sharpen up your mathematical know-how.

Now read the Objective and do the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to calculate in writing the quantity of brick needed to construct five different types of walls given the length, width and height of each:

a. single wythe of wall using standard brick in stretcher bond.
b. single wythe of wall using engineer's brick in stretcher bond.
c. two wythes of wall using standard brick in common bond.
d. single wythe of wall using Roman brick in stretcher bond.
e. single wythe of wall using standard brick in Flemish bond.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XIV-1, an estimable show.
2. Read pages 12 and 13 of Plan Reading for Brickmasons.
3. Review Unit I, task package 3, if necessary.
4. Packages 1, 6, 7, and 17 of Mathematics for Vocations will be used in calculating the quantity of brick for a given wall.
5. View information sheet and figure 1, brick estimating, in this task package for examples.
6. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

1. Acquire paper from your instructor for calculating in writing the quantity of brick needed to construct these five brick walls.
2. Determine the quantity of brick for a single wythe, using standard brick in stretcher bond 42' long x 9' high.
3. Detefmine the quantity of brick for a 4" wall, using engineer's brick in stretcher bond 76' long x 9' 8" high.
4. Determine the quantity of brick for an 8" wall, using a standard brick in common bond 28 1/4" long x 12' 8" high.
5. Determine the quantity of brick for a 4" wall, using Roman brick in stretcher bond 48' long x 16' 4" high.
6. Determine the quantity of brick for a 4" wall, using standard brick in Flemish bond 28 1/4" wide x 48' long x 9' high (4 sides).
7. When you have the quantity of brick calculated, let your instructor evaluate your amounts. You will need to retain a copy of the answers for the quantity of brick required to construct the given wall; they are the basis of the next task package.

It takes a little yeast to make the dough rise; it takes a little work to make the dough.

Give a good estimate of your ability by doing well in your masonry course.

To estimate the number of face brick and common brick needed to build the foundation walls of the building in PLAN A, Information Sheet 1, using a 3/8" mortar joint. The brick are to be laid in stretcher bond (no header courses).

The brick on the outside (1 width) are face brick, and the rest of the wall (2 widths) will be common brick.

To estimate the number of face brick needed for the foundation walls:

a. Multiply: the perimeter of the foundation walls x the height of the foundation walls.

144'	perimeter of the foundation walls
x 12'	height of the foundation walls
288	
144	
1728	sq. ft. of walls

b. Deduct the area (number of sq. ft.) of all openings in the foundation from the area (number of sq. ft.) of walls.

1,728	sq. ft. area of walls
- 416	sq. ft. area of openings
1,312	sq. ft. area of wall to be covered with face brick

c. Multiply: The number of sq. ft. of wall to be covered with face brick x the number of brick needed to build 1 sq. ft. of wall 4" wide (from the table).

1,312 x 6 2/3 face brick needed to cover 1 sq. ft. of wall laid with 3/8" mortar joint.

1,312	sq. ft. of wall to be covered with face brick.
x 6 2/3	face brick needed to cover 1 sq. ft. of wall.
3/ 2,624	
874 2/3	
7,872	
8,746 2/3 = 8,747	face brick needed for the foundation walls

d. Subtract: the number of face brick needed for the outside 4" of the foundation walls from the total number of brick needed to build the foundation walls; the remainder will be the number of common brick needed.

25,280	total brick needed for the foundation walls
- 8,747	face brick needed for the foundation walls
16,533	common brick needed for the foundation walls

PLAN A

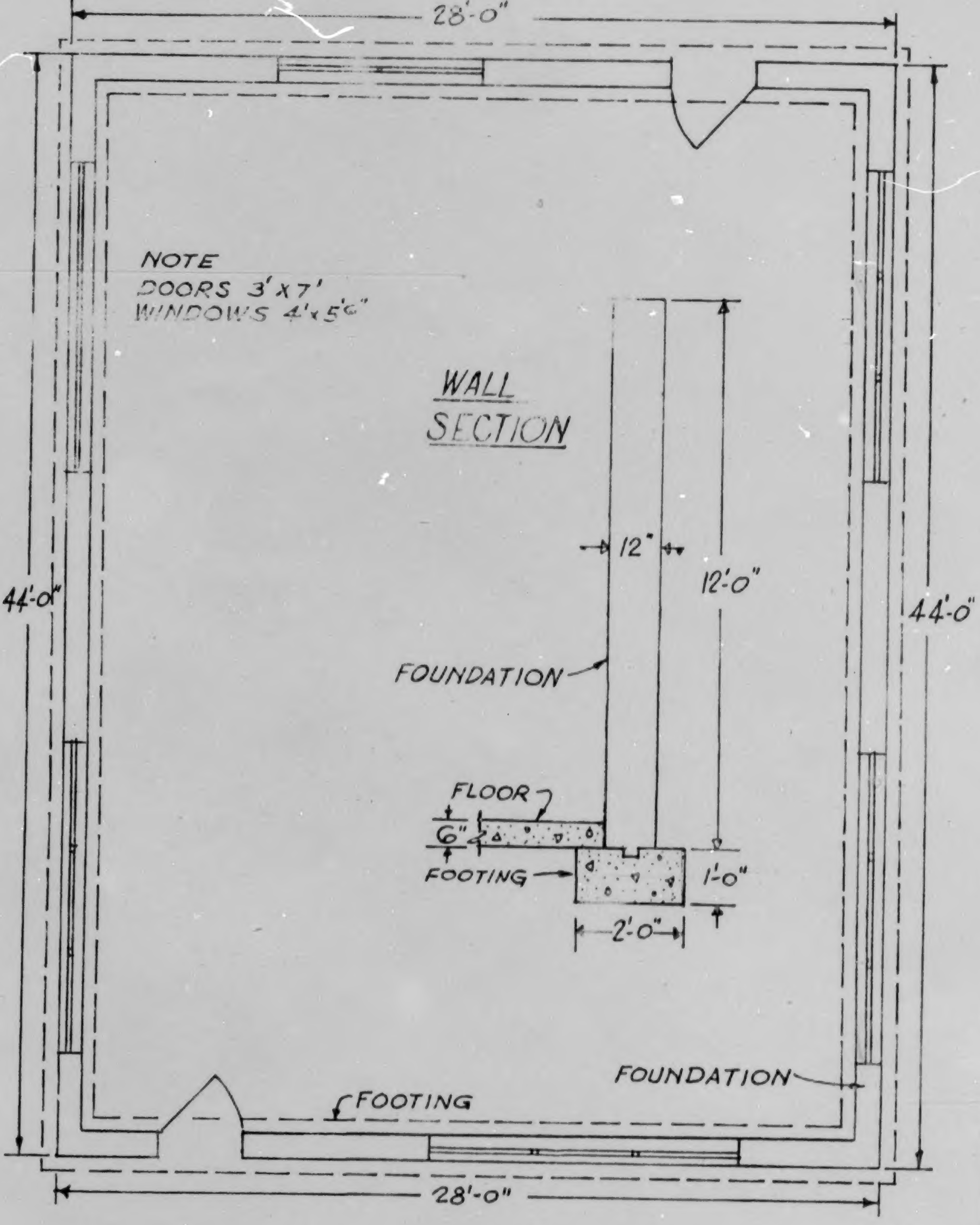

28'-0"
44'-0"
44'-0
NOTE
DOORS 3'x7'
WINDOWS 4'x5'6"
WALL SECTION
12"
12'-0"
FOUNDATION
FLOOR
6"
FOOTING
1'-0"
2'-0"
FOUNDATION
FOOTING
28'-0"

Figure 1

BM-XIV-2

UNIT XIV: ESTIMATING MASONRY MATERIAL FOR A GIVEN WALL

TASK PACKAGE 2: CALCULATING AMOUNT OF MORTAR

PREREQUISITES: NONE

RATIONALE:

You have no doubt heard about the mortar board that the graduating seniors wear at their graduation exercises. When you wear your mortar board at yo[illegible] graduation, by that time you should know how to calculate mortar quantities for masonry projects. The mortar involved in this task package is of the kind to bond masonry units together and, in order to know the quantity needed for the given brick wall, it is necessary to calculate it. It will be necessary to bridge the gap between the first task package (quantity of brick) to the amount of mortar necessary for the amount of brick for the given wall. In that task package you gained knowledge that will help in the mathematical calculations of this task package. Now read the Objective, do the Learning Activity and complete the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to calculate in writing the quantity of mortar needed to construct a brick wall given the length, width, height and mortar joint thickness. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Read and study pages 12 and 13 of Plan Reading for Brickmasons, or pages 54 - 56 of Bricklaying Vocational Training.
2. Use mathematics packages 5, 12 and 17 to calculate quantity of mortar.
3. Proceed to the Learning Practice.

LEARNING PRACTICE:

1. Using the information that you calculated in this task package, (quantity of brick), calculate the quantities of mortar necessary to lay up the following walls.
2. Obtain paper from your instructor for your calculations.
3. Determine the amount of mortar, in cubic feet, for a wall 42' long x 9' high, using 3/8" mortar joints and standard brick in stretcher bond.

LEARNING PRACTICE (cont'd):

4. Determine the amount of mortar, in cubic feet, for the quantity of brick calculated for a wall 76' long x 9' 8" high, using 1/2" mortar joints and engineer's brick in stretcher bond.
5. Determine the amount of mortar, in cubic feet, for the quantity of brick calculated for a wall 28' 4" long x 12' 8" high, using 3/8" mortar joints and standard brick in common bond.
6. Determine the amount of mortar, in cubic feet, for the quantity of brick calculated for a wall 48' long x 16' 4" high, using 1/2" mortar joints and Roman brick in stretcher bond.
7. Determine the amount of mortar, in cubic feet, for the quantity of brick calculated for a 4-sided wall 28' 4" wide x 48' long x 9' high, using 1/2" mortar joints and standard brick in Flemish bond.
8. Now that you have the quantity of mortar needed to construct the given walls, have your instructor evaluate them again. As for this task package, retain the figures of amounts of mortar needed in order to calculate the materials of the next two task packages.

This is like building a pyramid from the bottom up.

When you wear your mortar board at graduation, you will know all about this process of calculating quantities of mortar.

UNIT XIV: ESTIMATING MASONRY MATERIAL FOR A GIVEN WALL

TASK PACKAGE 3: CALCULATING AMOUNT OF MORTAR CEMENT

PREREQUISITES: UNIT XIV, TASK PACKAGE 2

RATIONALE:

This task package deals with the ratio between the quantity of masonry cement and the amount of sand used in mixing a quantity of mortar to lay a number of brick to a given wall. The masonry cement is the cementious material and is usually a mixture of portland cement and lime or ground limestone. Masonry cement may be used in combination with portland cement, but it should never be used in place of portland cement or portland cement in place of masonry cement. Try to recall that masonry cement is to be used in the construction of walls, not slabs such as sidewalks, porches, basement floors, etc. It is now time to go to the Objective, then to the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to calculate in writing the quantity of masonry cement needed to construct a brick wall, given the length, width, height and mortar joint space.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Use mathematics packages 5, 11 and 17 to calculate quantity of masonry cement.
2. Use the following information to calculate quantity of masonry cement for the calculated quantity of mortar.

   Note in the table for the given mortar space of 3/8" that a greater quantity of M type mortar is needed in relationship to the O type. The difference in the amount contributes to the increased strength of the mortar joint.

LEARNING ACTIVITY (cont'd):

Bags of Masonry Cement Required to Lay 1000 Brick

MORTAR TYPE	WALL THICKNESS	WIDTH OF JOINTS IN INCHES			
		1/4"	3/8"	1/2"	5/8"
M	4"	2.7	4.1	5.5	7.0
N	4"	2.3	3.5	4.7	6.0
S	4"	2.0	3.0	4.1	5.2
O	4"	1.8	2.7	3.6	5.7

4. Proceed to the Learning Practice.

LEARNING PRACTICE:

1. Using the information retained from calculating the amount of mortar needed to construct the given walls and the table supplied in the Learning Activity, calculate the quantity of masonry cement needed to construct the given wall of the first task package of this unit.
2. The calculations should be the number of bags of masonry cement to the quantity of mortar needed to the given wall. Any part of a bag is to be counted as a full bag.
3. Obtain paper from your instructor for your calculations.
4. Determine the bags of masonry cement needed for the quantity of mortar calculated from the brick wall 42' long x 9' high, using 3/8" mortar joint, type N mortar.

LEARNING PRACTICE (cont'd):

5. Determine the bags of masonry cement needed for the quantity of mortar calculated from the brick wall 76' long x 9' 8" high, using 1/2" mortar joint, type S mortar.

6. Determine the bags of masonry cement needed for the quantity of mortar calculated from the brick wall 28' 4" x 12' 8" high, using 3/8" mortar joints, type M mortar.

7. Determine the bags of masonry cement needed for the quantity of mortar calculated from the brick wall 48' long x 16' 4" high, using 1/2" mortar joint, type S mortar.

8. Determine the bags of masonry cement needed for the quantity of mortar calculated from the four-sided brick wall 28' 4" wide x 48' long x 9' high, using 1/2" mortar joints, type N mortar.

9. You now have one of the two ingredients which are needed for making a quantity of mortar. In the next task package you will calculate the quantity of sand and discuss the water. Halfway home - so get with it.

You're cementing your way toward a profitable career in masonry.

BM-XIV-4

UNIT XIV: ESTIMATING MASONRY MATERIAL FOR A GIVEN WALL

TASK PACKAGE 4: CALCULATING QUANTITY OF SAND

PREREQUISITES: UNIT XIV, TASK PACKAGES 2 AND 3

RATIONALE:

The footprints in the sands of time are legendary, just as is the correct amount of sand needed in the mixing of mortar when it comes to constructing a building. The sand used in the mortar must conform to a specified quantity established by the American Society of Testing of Materials, and the mason needs to be familiar with this standard amount. The building supply firms generally furnish the sand from the masonry contractors' estimates. This fact is another reason for knowing how to calculate the amount of sand needed for the job, as well as the amount needed to make the mortar mixture. Now is the time to continue to the Objective, then do the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to calculate in writing the quantity of sand needed to construct a brick wall, given the length, width, height, and mortar joint thickness. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Use mathematics packages 5, 10, 11, 12 and 17.
2. Use the following information of sand proportion to masonry cement for quantity of mortar:

   a. 215 lbs. : 1 bag mortar

   b. 1 ton : 9.3 bags mortar

   c. 1 cu. yd. : = 2500 # sand

   Example: Calculate the quantity of sand to lay 7500 brick, using 1/2" mortar joint, type M.

5.5 bags per thousand
x7.5
275
385
41.25 = 42 bags mortar

215 # per bag
42
430
860
9030 #

3.61 cu. yds.
2500 /9030.0
7500
15300
15000
300

Answer: 3.61 cubic yards of sand

LEARNING PRACTICE:

1. Using the information retained from task package 2 of this unit, calculate quantity of mortar needed, and from the information supplied in the Learning Activity, calculate the quantity of sand in cubic yards needed to construct the given walls of the first task package of the unit.
2. Obtain paper from your instructor for your calculations. Retain the fraction part of a cubic yard.
3. Determine the cubic yards of sand needed for the quantity of mortar calculated from the brick wall 42' long x 9' high.
4. Determine the cubic yards of sand needed for the quantity of mortar calculated from the brick wall 76' long x 9' 8" high.
5. Determine the cubic yards of sand needed for the quantity of mortar calculated from the brick wall 28' 4" long x 12' 8" high.
6. Determine the cubic yards of sand needed for the quantity of mortar calculated from the brick wall 48' long x 16' 4" high.
7. Determine the cubic yards of sand needed for the quantity of mortar calculated from the four-sided brick wall 28' 4" wide x 48' long x 9' high.
8. This is the second of the ingredients needed to mix a quantity of mortar; the only remaining material is the water. To make the mixture add the greatest amount of water to make your mortar workable. Do the sand and the water make you dream of the lake or ocean? One day soon, after gathering in some of that green from working, you will be able to take advantage of the sand and water at the ocean.

UNIT XIV: ESTIMATING MASONRY MATERIAL FOR A GIVEN WALL

TASK PACKAGE 5: CALCULATING BLOCK QUANTITIES

PREREQUISITES: UNIT I, TASK PACKAGE 4

RATIONALE:

How many blocks would you need to block if you needed to block some blocks? This question is about as nonsensical as the old query about the woodchuck chucking wood. But this is a no-nonsense package on the accurate calculation of block quantities.

In this task package you will be able to calculate the quantity of blocks needed to construct a block wall. It is necessary to calculate the amount of materials needed in the construction of any building and, as the carpenter needs to know how many 2 x 4's are needed in a given wall, the mason must figure the number of blocks needed in a given wall. Estimating the quantity of blocks for the given wall aids in costing out the building and the ordering of supplies. This package will further develop your math skills as well as plan-reading abilities. Now, continue on by reading the Objective and doing the Learning Activity and the Learning Practice. Refer to the Objective as often as necessary.

OBJECTIVE:

Upon completion of this task package you will be able to calculate in writing the quantity of blocks needed to construct three different types of walls given the length, width, and height of each.

a. single wythe of wall, using stretcher bond.

b. cavity wall, using stretcher bond.

c. foundation wall, using stretcher bond.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Use mathematical packages 1, 3, and 5 in calculating the quantities of blocks needed in the Learning Practice.
2. You will not have an opportunity to view a sound-slide package for this task package, so when you are in the downtown area, observe the block structures and then attempt to estimate the quantity of blocks used in the construction of a structure without having dimensions to work with.
3. There is no textbook material available so, using the example provided in the Learning Practice, calculate the quantities of blocks for the given wall.

LEARNING ACTIVITY (cont'd):

4. This completes the Learning Activity; begin on the Learning Practice.

LEARNING PRACTICE:

One of the various means of estimating the quantity of blocks needed for a given wall is this example:

Example: How many blocks are needed for a wall 48' long x 8' high?

a. Calculate the number of blocks per course.

b. Determine the number of courses in the height of the wall.

c. Multiply the number of blocks per course by the number of courses for the quantity of blocks for the given wall.

d. The block is 16" or 1 1/3' in length. Divide this block length into the wall 48' x 1 1/3' for number of blocks per course. 48 ÷ 1 1/3 = 48 ÷ 4/3 = 48 x 3/4 = 36 blocks per course.

e. The block is 8" or 2/3' in height. Divide this block height into the elevation of the wall (8'); your answer should be 12 courses of blocks.

36 blocks per course
x 12 course wall height

432 blocks needed to construct the wall 48' long x 8' high.

1. Obtain paper from your instructor for calculating in writing the quantity of blocks needed to construct three different types of

LEARNING PRACTICE (cont'd):

walls.

2. Determine the quantity of blocks for a block wall 120' long x 24' high, using stretcher bond.
3. Determine the quantity of block for a block cavity wall 75' long x 18' high, using stretcher bond.
4. Using figure 1 of this task package, determine the quantity of blocks needed for the foundation wall using stretcher bond.
5. Calculate with the dimensions shown on the drawing; the height elevation is to be 8' for the figure 1 foundation.

   Now that you have the foundation built on solid ground, continue with the next task package after your instructor has evaluated your work.

Stay with it! Happiness is a job well done.

Block by block, you're steadily building up your skills as a mason.

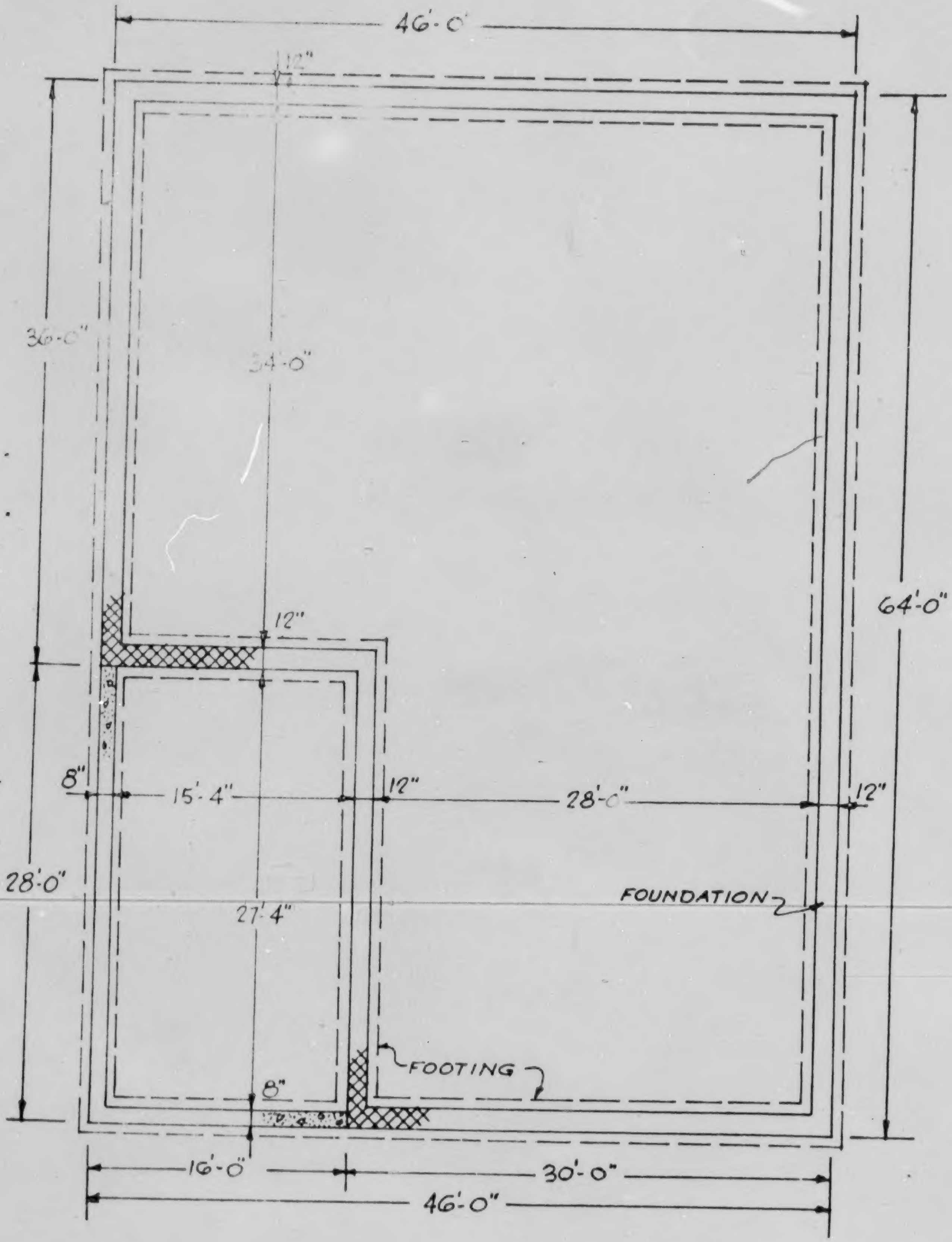

46'-0'
12"
36'-0"
34'-0"
64'-0"
12"
8"
15'-4"
12"
28'-0"
12"
28'-0"
FOUNDATION
27'-4"
FOOTING
8"
16'-0"
30'-0"
46'-0"

Figure 1

UNIT XIV: ESTIMATING MASONRY MATERIAL FOR A GIVEN WALL

TASK PACKAGE 6: CALCULATING METAL WALL TIES

PREREQUISITES: UNIT V, TASK PACKAGE 2

RATIONALE:

This package concerns ties. Not neckties, railroad ties, or hog ties. The ties here are metal wall ties, which all good masons should know about.

Have you ever had the misfortune of having a tie rod end break at the front wheel section of your automobile? The tie rod has a definite purpose for the front end of the automobile, just as the metal wall ties have an important function to tie two or more wythes of masonry walls together for structural strength. Metal ties are also used to attach brick veneer to wood frame or other structural walls. As with other building material it is necessary to calculate the quantity of wall ties needed for a structure, and the local building codes provide the criteria for the location of the metal ties in the wall. There are many varieties of metal ties, and your local building material supply centers can furnish this information. This package has been developed to provide you with Learning Activity and Learning Practice. Continue with the Objective, the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to calculate in writing the quantity of metal wall ties needed in the construction of four different types of walls given the length, width or height of each:

a. 8" solid brick wall using Z-bar metal ties.
b. brick cavity wall using rectangular metal ties.
c. brick veneer wall using corrugated metal ties.
d. 12" composite wall using continuous metal ties (durawall).

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Sorry, no sound-slide package for this package.
2. Read information about the metal ties on pages 15 and 16 of Bricklaying Vocational Training.
3. This completes the Learning Activity. Proceed to the Learning Practice.

LEARNING PRACTICE:

Use the criteria that most building codes provide to determine the quantities of metal wall ties for the given walls as recorded on page 15 of Bricklaying Vocational Training.

LEARNING PRACTICE (cont'd):

1. Obtain paper from your instructor and, if you are not sure of the Objective, discuss it with him at this time.
2. Determine the number of Z-bar metal ties needed for an 8" solid brick wall 120' long x 43' high.
3. Determine the quantity of rectangular metal ties needed for a brick cavity wall 260' long x 28' high.
4. Determine the quantity of corrugated metal ties needed for a brick veneer wall 144' long x 9' 6" high.
5. Determine the quantity of continuous metal ties needed for the plan shown on figure 1 of this task package. The answer should be in total lineal feet.

   Give the answer to your instructor for evaluation. See, these types of math problems are fun when relating them to the building of a structure.

It looks as if you're really tying in your increasing knowledge of masonry.

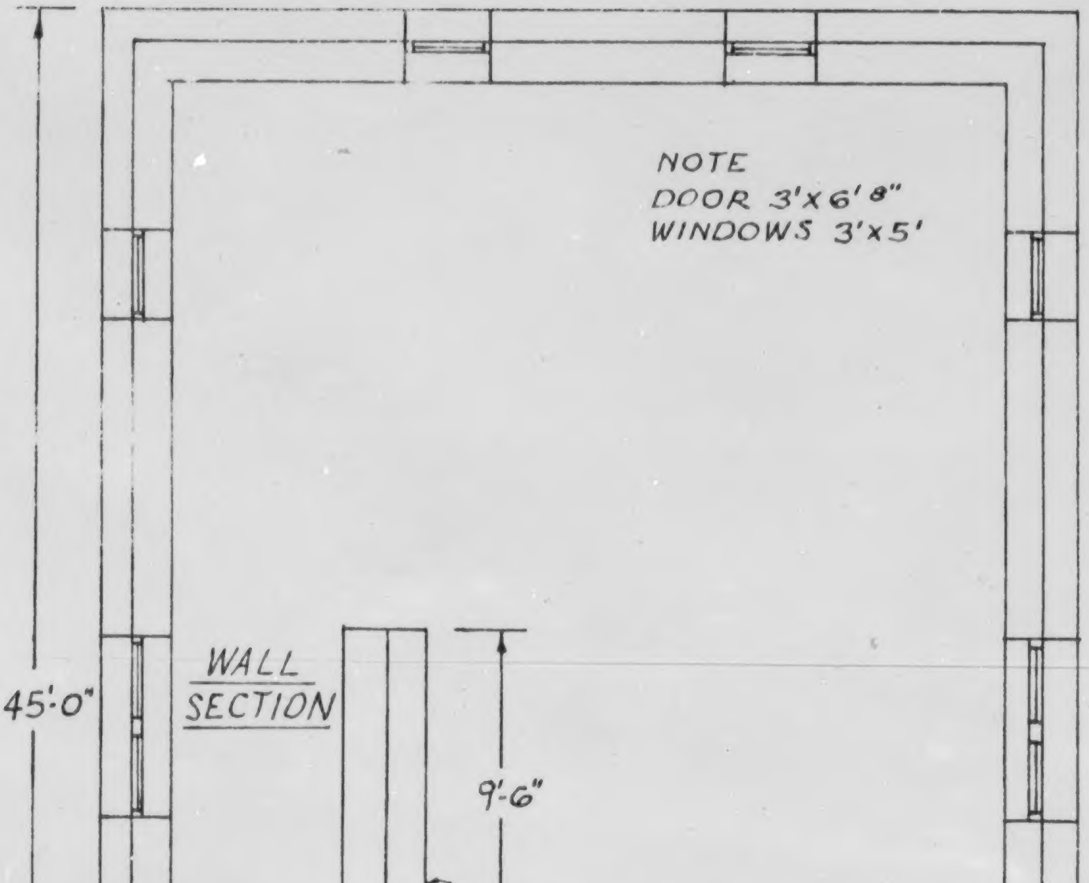
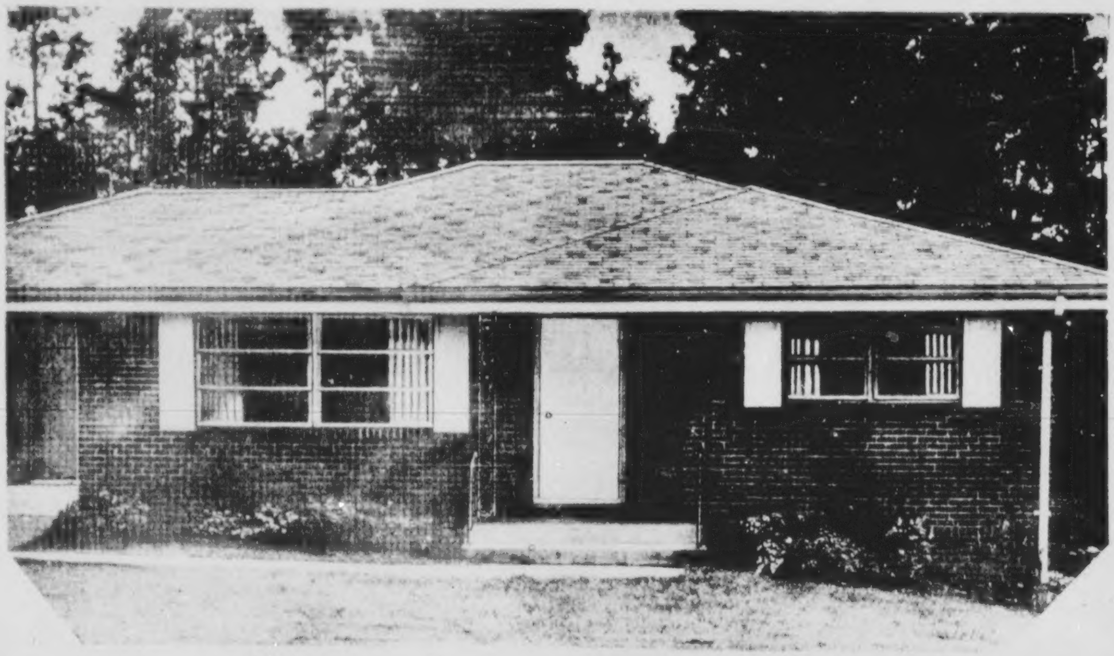
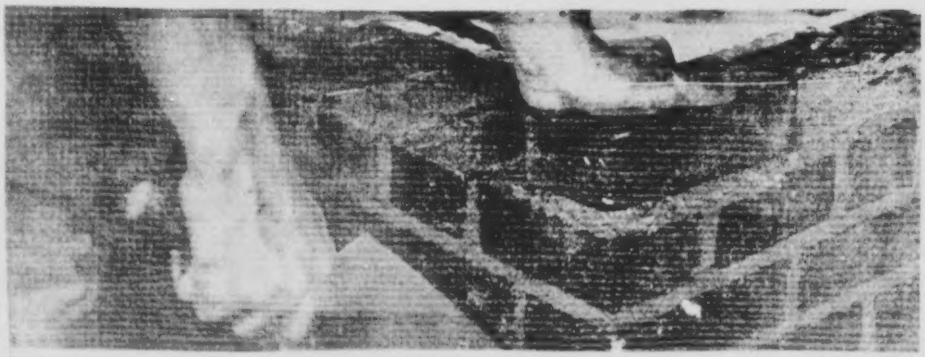

NOTE
DOOR 3'x6'8"
WINDOWS 3'x5'
WALL SECTION
45'-0"
9'-6"
INTERIOR FACE
FACE OF WALL
FL. LINE
8"
8"
4"
INTERIOR
FACE
25'-0"

Figure 1

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330





CLUSTER: MASONRY
COURSE: BRICKLAYING

OE003732 (2)

UNIT XV: BUILDING LAYOUT

PREREQUISITES: UNIT XV, TASK PACKAGES 1 AND 4

RATIONALE:

When you look at all the structures in your locale did it ever occur to you that someone had to lay out the structures before any other trade could do its part of the work. That is what this task package is all about. The layout of a building on a job site by measuring with a 100' tape, using the 6-8-10 and diagonal methods for checking squareness. The builder's level (transit) will also be used to lay out a building as well as to establish elevation leveling points. Batter-board construction and use are also necessary to the operation of building layout and are included in the unit. You will set up a transit for use and will be able to identify the parts of the transit using the information found in one of the packages. Continue by reading the General Objective for the unit and the Specific Objectives for the individual task packages. Go on to the Learning Activity which will supply the information as to what you are to accomplish and the proper procedures.

OBJECTIVES:

General:

Upon completion of this unit package you will be able to lay out a building by measuring and using a builder's level.

OBJECTIVES (cont'd):

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Use a folding rule or tape to measure a given length of wall, with a standard of accuracy of ± 1/8" for measurement, using the rule or tape.

   Your performance will be evaluated in accordance with the instructor's checklist.

2. Construct and position a batter-board system for a wall or foundation maintaining the following standards:

   a. batter-boards to be positioned 4' to 5' beyond all building lines.

   b. height of batter-boards to be 18" to 24" above ground level.

   Your performance will be evaluated in accordance with figure 1 in this task package.

3. Lay out a building or foundation using the 6-8-10 and diagonal methods.

   Your performance will be evaluated in accordance with the instructor's checklist.

4. Identify in writing, from the illustration in this task package, the following:

OBJECTIVES (cont'd):

a. all component parts of the builder's level.

b. list the seven steps in setting up the level.

Your performance will be evaluated in accordance with the instructor's checklist.

5. Use the builder's transit to establish level points to an elevation standard of ± 1/4".

Your performance will be evaluated in accordance with the instructor's checklist.

6. Lay out a job site using a builder's transit.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

This unit should be completed in numerical order beginning with task package 1 except for the 5th and 6th task packages. These two could be interchanged and it may be to your advantage to complete number 6 package before number 5. Packages 2, 3 and 4 must follow after package number 1, for each depends on the preceding package (s). In the task packages you are to view a sound-slide program, read the assignments, and perform some practical exercises. The number and names of the task packages included in this unit are:

TASK PACKAGE 1: FOLDING RULE AND TAPE

TASK PACKAGE 2: BATTER BOARD

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 3: LAYOUT OF A BUILDING

TASK PACKAGE 4: BUILDER'S LEVEL

TASK PACKAGE 5: LEVELING WITH A BUILDER'S LEVEL

TASK PACKAGE 6: LAYING OUT A JOB SITE USING BUILDER'S LEVEL

Upon completion of the Learning Activity, begin work as outlined. If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT XV: BUILDING LAYOUT

TASK PACKAGE 1: FOLDING RULE AND TAPE

PREREQUISITES: NONE

RATIONALE:

It's not time to fold up now. Just tape your attention here to the folding rule and tape.

It is obvious that proper interpretation of reading a folding rule or tape is fundamental to building construction, as without accurate interpretation of the rule, dimensions given on a plan would be useless. The folding rule and the tape are indispensable measuring devices that the brick mason uses whenever it is necessary to lay out a wall, measure a distance along the wall, measure a distance along the wall to place a door, window spacing, or for any other piece of equipment that must be placed in or through the wall. The brick mason must know how to use the folding rule with the inch marking to measure as well as the brick mason's spacing rule you learned about in a previous task package. Read the Objective and Learning Activity and then do the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to use a folding rule or tape to measure a given length of wall with a standard of accuracy of ± 1/8". Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. Begin the Learning Activity by going to the Resource Center and viewing sound-slide package BM-XV-1, starring Tapey Rule.
2. View figure 1 in this task package. Observe the marking on the enlarged view showing the 1/16" graduations of the one inch scale. This scale repeats itself the length of the folding rule or tape, even if the tape is 100 foot in length.
3. There is no reading material available on the use of the folding rule or tape, so see your instructor for a demonstration for measuring a wall.
4. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Folding rule
2. 50' or 100' tape

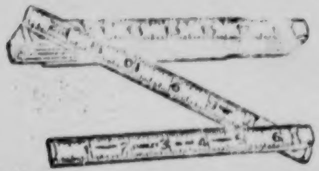
LEARNING PRACTICE (cont'd):

1. Observe your instructor's demonstration of the uses of the folding rule and 100-foot tape. Be prepared to demonstrate the use of these measuring devices when the instructor requests you to do so.
2. Make and record the following measurements to the nearest 1/16" or 1/8" as indicated in the following exercises. Accuracy of measurement is important in this exercise, so be careful in your interpretation. When you use the 50 or 100-foot tape it will be necessary to have a classmate hold the zero-end of your tape. If you find in making your measurements that you are having trouble with common fractions and mixed numbers, refer to Mathematics for Vocations, packages 1 and 2.
3. Observe the graduation marks on the one inch scale in figure 1 of this task package so you will be able to measure the fractional part of the inch in making your measurements.
4. Using the folding rule measure the length of five standard brick, including a 3/8" head joint to accuracy of ± 1/8".
5. On the floor of the shop in a space designated by the instructor, mark and measure the length of the following walls, using the folding rule:
   a. 4 feet 1 5/8 inch length.
   b. 7 feet 7 7/8 inch length.
   c. 3 feet 3 1/4 inch length.

LEARNING PRACTICE (cont'd):

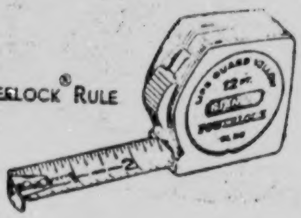
6. Using the 50 or 100 foot tape, measure the exterior wall which contains the garage door of the masonry shop.
   a. length of the wall ± 1/8".
   b. height of the wall ± 1/8" from ground level to the head of the garage door.
7. Now discuss the measurements of the walls with your instructor to see how well you have met the Objective. If you have successfully achieved the Objective, he will indicate to you to proceed to the next task package. Congratulations! You now can scale to greater heights.

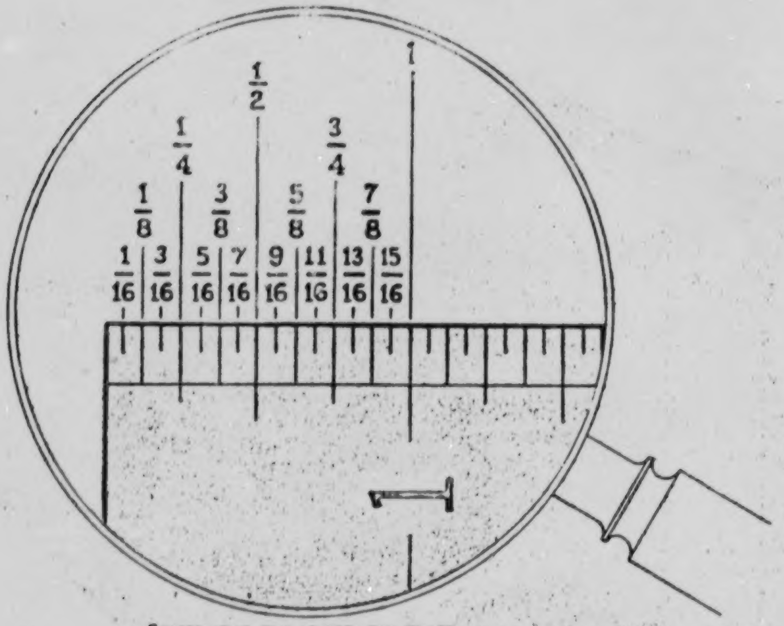
Don't fold up your rule or run in your tape until you have measured success.



FOLDING WOOD

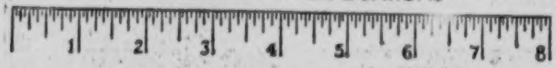
POWERLOCK® RULE




1/16
1/8
3/16
1/4
5/16
3/8
7/16
1/2
9/16
5/8
11/16
3/4
13/16
7/8
15/16
1

SIXTEENTHS ENLARGED SIX TIMES

SIXTEENTH INCH GRADUATIONS



EIGHT INCH GRADUATIONS

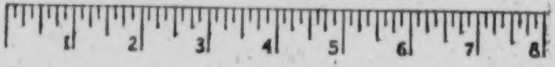


Figure 1

BM-XV-2

UNIT XV: BUILDING LAYOUT

TASK PACKAGE 2: BATTER BOARD

PREREQUISITES: NONE

RATIONALE:

Batters-up sounds like the beginning of a baseball or softball game, but it is the beginning of the learning about batter-boards used in the construction industry.

The subject of squaring the building to be constructed is one of the most important features to insure the success of any building operation. In order to place the lines of building in position, it is necessary to have some arrangement to support the line. This is where we use the batter boards. The long sides of the batter boards are designed to allow you room to adjust your lines as you are locating and squaring up the building. They must be placed far enough behind the building lines to allow the other operations of construction to be completed without disturbing the batter boards. Now continue with the reading of the Objective, then doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to construct and position a batter-board system for a wall or foundation maintaining the following standards:

a. batter-boards to be positioned 4' to 5' beyond all building lines.

b. height of batter boards to be 18" to 24" above ground level.

Your performance will be evaluated in accordance with figure 1 in this task package.

LEARNING ACTIVITY:

1. View sound-slide package BM-XV-2, featuring Batty Board.
2. Read page 80 of Masonry Simplified, Volume II.
3. Read the information and observe the batter board-pattern on figure 1 of this task package.
4. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Brick hammer
2. Sledge hammer
3. Stakes
4. Stock for batter board
5. Nails
6. Saw

LEARNING PRACTICE (cont'd):

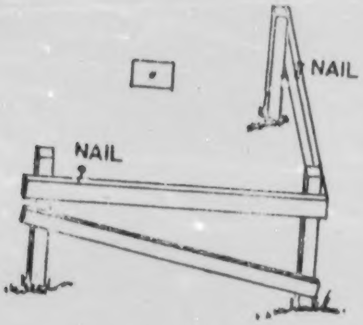
1. Discuss with your instructor the setting up of batter boards.
2. Take all of the tools and material to the job site to construct the batter boards.
3. As the reading or page 77 of Masonry Simplified, Volume II, specified, locate small stakes at each corner of the building layout.
4. At each corner construct a set of batter boards 4 to 5 feet behind the building line in the following manner:
    a. Partition and drive three long stakes approximately 2 feet into the ground and the remaining 1 1/2 to 2 feet above ground as shown on figure 1 of this task package. The stake should be positioned at right angles to each other and approximately 5 feet apart so the building lines can be adjusted along the batter-board for true location.
    b. Nail the batter-board to the upright stakes so the top edges are approximately 18 to 24 inches above the ground.
    c. Diagonally brace one of the legs of the batter-board system to give added strength.
5. The batter-boards are positioned 4 to 5 feet behind the building line to permit the excavator to dig the foundations without disturbing the batter-boards, for they are used again for other opeartions in the construction of the building.

LEARNING PRACTICE (cont'd):

6. This completes the Learning Practice. Have the instructor evaluate the Objective and continue to the next task package, where you will put the batter-board to use.

Make success your Objective in life.

ERECTING BATTER BOARDS



Batter boards are boards nailed to stakes driven in the ground just beyond the corners of the foundation walls, for the purpose of holding the lines in a secure position. They are built solid, so that they cannot shift their position by the earth giving away, when excavated, and to give ample room for working space and materials. The necessity of the boards is apparent when one can see that the stakes defining the outline of the foundation walls would have to be disturbed for excavating purposes. They also assure the lines being put in their proper places from day to day. They may be marked by a pencil mark, nail head or saw cut. The best method is to have saw cuts as they cannot be disturbed as a nail head or pencil mark can.

The best materials to use for the batter boards are pieces of 2 inch by 4 inch driven into the ground at least 2 feet or more, depending on the character of the ground. On these stakes nail firmly 7/8 inch by 4 inch boards.

Figure 1

UNIT XV: BUILDING LAYOUT

TASK PACKAGE 3: LAYOUT OF A BUILDING

PREREQUISITES: UNIT XV, TASK PACKAGES 1 AND 2

RATIONALE:

When you are playing golf with your best friend and with the match tied going to the 18th green, both golf balls are lying approximately the same distance from the cup. The one way you can guarantee a win or at least a tie is by sinking that putt. The putt must be very accurate. Accuracy is what needs to be practiced when you are laying out the building lines, squaring the first right angle corner and finally the diagonals of the completed building layout. It will be necessary to read your tapes while measuring the dimensions of the building, as when you read a green to sink a long putt. Now read the Objective, do the Learning Activity and then proceed with the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to lay out a building or foundation using the 6 - 8 - 10 and diagonal methods. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XV-3, featuring Larry Layout.
2. Read pages 79 and 80 of Masonry Simplified, Volume II.
3. Read pages 20 and 21 of Bricklaying III, by Delmar.
4. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. hammer
2. 100-foot square
3. Carpenter's square
4. Folding rule
5. Mason's line
6. Nails
7. Saw
8. Marking pencil

1. Discuss with your instructor the 6 - 8 - 10 and diagonal methods used in the layout of the building lines.
2. Take all your tools and equipment to the site layout you completed setting up the batter boards.

LEARNING PRACTICE (cont'd):

3. Using the illustration of figure 1 in this task package, locate line A by attaching the mason's line to the respective batter boards. The line can be attached to a nail driven into the batter board or by cutting a saw scarf in the board and tying the mason line to the board.
4. Next, attach line B to its respective batter board, using the "carpenter's" square (having a classmate as a helpmate) to aid in the aligning of the mason's line at corner of lines A and B.
5. Now check the corner using the 6 - 8 - 10 method described in the textbook. Have your instructor demonstrate how to mark the first leg onto the mason line with a pencil mark for reference.
6. When the two lines are adjusted so that the final measurements are 6' - 8' - 10', then locate the other lines onto the remaining batter boards. The accuracy of measuring the building is very important to the construction of the building.
7. When you are satisfied the building lines are correctly located, check the diagonals by measuring with the 100-foot tape from the corners established by the intersecting lines in front of the batter boards. The measurement between the two diagonal lines must be equal.
8. After you are satisfied that this exercise has been completed correctly, let your instructor check your work for your evaluation.

LEARNING PRACTICE (cont'd):

The excavation is now ready to be dug; so dig in and get another task package.

Success is the sum of planning and work.

LAYING OUT A SQUARE CORNER

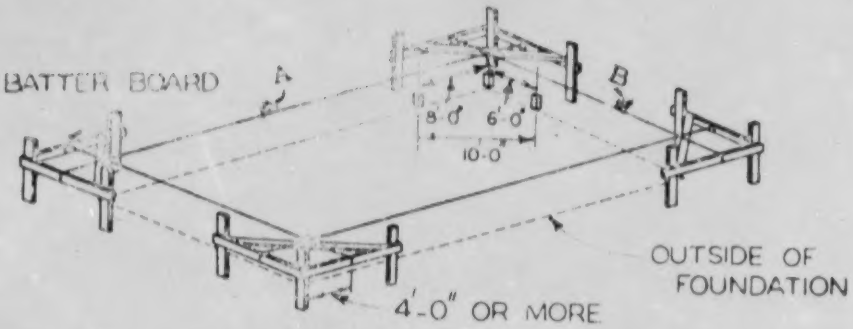

BATTER BOARD
A
B
8'-0"
6'-0"
10'-0"
OUTSIDE OF FOUNDATION
4'-0" OR MORE

Figure 1

BM-XV-4

UNIT XV: BUILDING LAYOUT

TASK PACKAGE 4: BUILDER'S LEVEL

PREREQUISITES: NONE

RATIONALE:

It's time to level with the builder's level. If you pause here, you will get to know a valuable instrument for the mason. And that's on the level.

This task package will carry you to a useful knowledge of how to obtain accurate layouts with a builder's level, known in many sections of the nation as a transit. Before the brick mason can use the transit for measurement purposes, he must first know the method of setting it up and the component parts of the builder's level. This is a precision instrument, so it must be treated with kindness and great care, in storage or in use. In this task package you will gain the skills of knowing the parts of the instrument, as well as how to set it up for use. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to identify in writing, from the illustration in this task package, the following:

a. all component parts of the builder's level.

b. list the seven steps in setting up the level.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XV-4, a star feature.
2. Read page 86 of Advanced Bricklaying, by Delmar.
3. Read Modern Carpentry, pages 43 to 51, on Leveling Instruments.
4. This completes the Learning Activity; now begin the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Builder's level (transit)   2. Tripod

1. Report to your instructor and discuss the builder's level, its care, installation and use.
2. In the blank spaces write the component parts of the builder's level from the illustration on figure 1.

LEARNING PRACTICE (cont'd):

1. ____________________ 5. ____________________

2. ____________________ 6. ____________________

3. ____________________ 7. ____________________

4. ____________________ 8. ____________________

3. In the setting up of the builder's level, fill in the blank spaces that complete the seven steps:

a. In setting up the tripod, it is necessary to be certain it is set ____________ on the ground.

b. Set the tripod head as ____________ as possible with the eye.

c. Check the leveling ____________. Be sure they are __________.

d. Place the ____________ of the telescope over two opposite leveling screws.

e. Follow these two rules for final adjustment:

a. Grasping the leveling screws (under the barrel) with the thumb and forefinger, turn both thumb screws in or both out, with the same amount of ____________________.

b. The ____________ will always go in the same direction as the ____________ thumb.

f. After ____________ the bubble over one pair of screws, turn the __________ to the opposite set of leveling screws and repeat the just mentioned operation until the barrel can

LEARNING PRACTICE (cont'd):

be turned in any ______________ with the bubble ____________ in the ______________.

g. Always check the ____________ bubble with each new __________.

4. Do not strain the threads on the screws while adjusting the builder's level but, finishing this task package, you can strain for the next task package after you have the instructor check your work.

Masonry could very well be your ticket to success.

TRANSIT

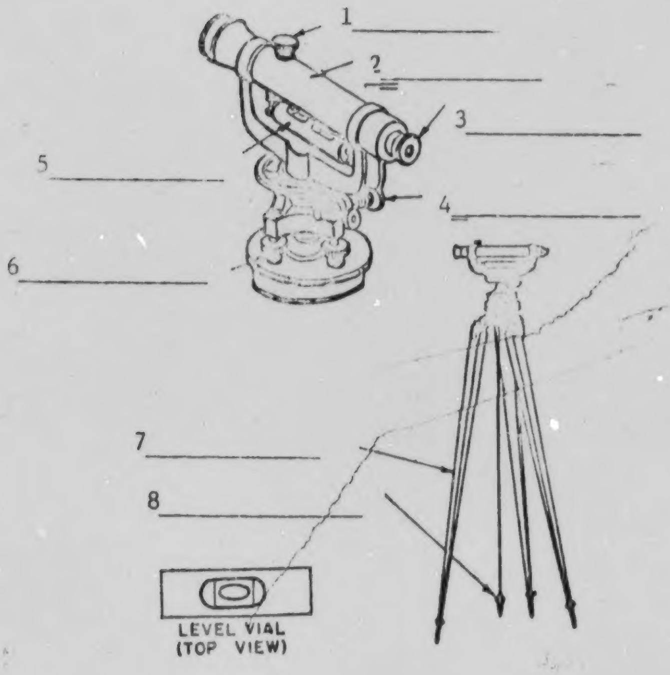

1 ____________
2 ____________
3 ____________
4 ____________
5 ____________
6 ____________
7 ____________
8 ____________
LEVEL VIAL
(TOP VIEW)

Figure 1

UNIT XV: BUILDING LAYOUT

TASK PACKAGE 5: LEVELING WITH A BUILDER'S LEVEL

PREREQUISITES: UNIT XV, TASK PACKAGE 1

RATIONALE:

Don't give in to any transitory fantasies here, but become familiar with the use of the transit. This transit has nothing to do with the bus line, taxicabs or subway systems, but this task package will carry you to a useful knowledge on how to obtain accurate leveling points with a transit.

A brick mason must be able to use a builder's level or transit with precision if he is to establish grades (leveling points) with a great degree of accuracy; the skill in using a builder's level or transit is obtained by the actual practice in using this instrument. Continue by reading the Objective, and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to use the builder's transit to establish level points to an elevation standard of ± 1/4".

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XV-5, a level-headed sh[illegible].
2. Read Modern Carpentry, pages 43 to 51, on Leveling Instruments.
3. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Builder's level (transit)
2. Tripod
3. Rod or story pole
4. Stakes
5. Wood folding rule
6. Marking pencil

1. Report to your instructor and discuss the use of the leveling instrument to establish level points. Check out the transit from the instructor.
2. Set up the transit on the tripod as in task package four of this unit at the site location of the batter-boards.

LEARNING PRACTICE (cont'd):

3. On the batter-board, at the highest elevated point on the job site, place a mark on one of the corner stakes six inches above the ground. This is known as a bench mark.

4. With the aid of a classmate, as the rod man, have him hold the bottom of the rod to the bench mark on the batter-board. Sight a level line with the transit to the rod, setting the target on the rod to the sighting cross hair of the transit. A story pole can be used in place of the rod and target by placing a pencil mark on the story pole for the transit reading. The third method for reading the setting of the level to the bench mark is by using the folding rule, holding it in the same manner as the rod, and with you reading the scale on the folding rule.

5. Have your helper hold the rule against each corner on the batter-board in succession, as you sight a level line with the transit, having your helper line up the rule to the exact bench mark as before. Have him mark this dimension in each batter-board.

6. When you have completed this exercise you will have sighted a level line to all corners; with the same technique as you just performed, you can check the height of your walls as the building is being constructed in order to eliminate the error of having the building out of level.

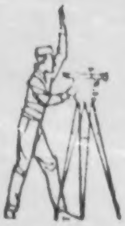
LEARNING PRACTICE (cont'd):

7. When you are satisfied you have completed the job satisfactorily, have the instructor check your work.
8. You did a good job and that's on the level. For more transit work go to the next task package.

Keep your eye on your destination - success!

leveling

Finding out the difference of grade between several points is called leveling. To do this: Set the instrument about midway between the two points whose difference of grade is to be determined and level the instrument, as explained on the preceding page. Hold the rod "straight up" at one of the two points (called stations) and read it through the telescope where the horizontal crosshair seems to cut the graduations on the rod. Noting this reading, take the rod and place it "straight up" over the other station. Then, without disturbing the instrument in its position, swing the telescope clear around to sight the rod and note the reading. The difference between the two readings will tell how much one station is above or below the other. Example:



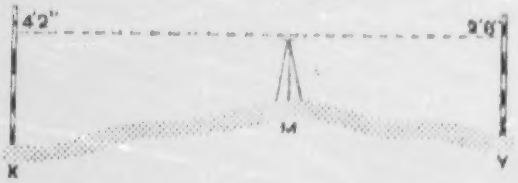


Figure 9

M is the instrument, placed about midway between the two points whose grades are to be determined. At station X, the rod reads 4 feet, 2 inches; at station Y, it reads 2 feet, 8 inches. Station X is then 1 foot, 6 inches below station Y—the figure you get when you subtract the lower level from the higher.

running straight lines with a level

Level the instrument over one end point (Figure (11)). Hold the rod at the first stake point and adjust the position of the target so that it falls on the crosshairs of the instrument. Move the rod back to the next point and proceed as before. Repeat as many times as necessary. When the rod moves beyond the range of the instrument, set up over the next to the last marked point and move the instrument until the target falls on the crosshairs. Then proceed as before.

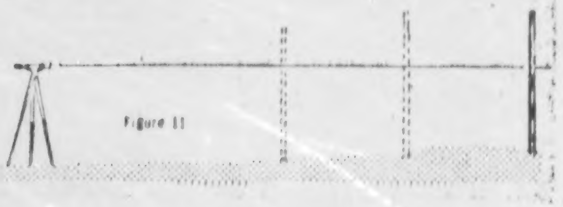


Figure 11

Figure 1

UNIT XV: BUILDING LAYOUT

TASK PACKAGE 6: LAYING OUT A JOB SITE USING BUILDER'S LEVEL

PREREQUISITES: UNIT XV, TASK PACKAGE 4

RATIONALE:

How do you think the astronauts reached the moon? You know it was by spaceship, but the entire trip was planned and laid out for the desired route of the spaceship, and the spaceship was kept on course with delicate instrument readings.

In this task package you will not be working with as fragile an instrument as the astronauts used but, nevertheless, you are working with a precision instrument that, when correctly used, will chart a building layout. The necessity of accurately reading the numbers and degree reading on the dial will benefit in less reworking of the operations in employing the transit. Adjust to the environment and read the Objective, do the Learning Activity and proceed to the Learning Practice.

OBJECTIVE:

> Upon completion of this task package you will be able to lay out a job site using a builder's transit.
>
> Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package XV-6, starring J.O.B. Site.
2. There will be no reading assignment for this task package due to unavailable material. So follow the directions very carefully in the Learning Practice.
3. View illustrations on figure 1 of the task package.
4. This completes the Learning Activity; begin now with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Builder's level (Transit)
2. Tripod
3. 100-foot tape
4. Small stakes
5. Hammer
6. Nails

1. In the illustration of figure 2 the line A-A represents the front lot line, so for your first operation set up the level with plumb

LEARNING PRACTICE (cont'd):

bob centered over point J. Level the instrument. You did not use the plumb bob with the transit in other task packages, so check with your instructor to see that it is being properly set to point J.

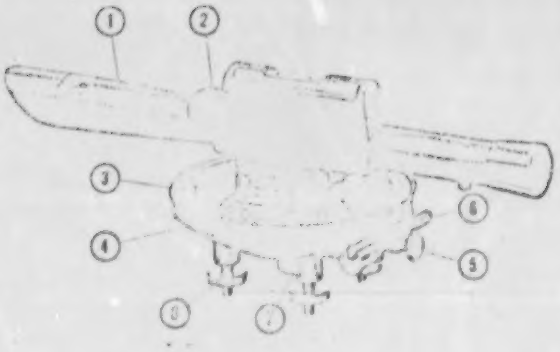
2. Sight level on one end of point A, aligning the vertical crossbar in the barrel to that point A.
3. Tighten clamp screws at that position.
4. Move the horizontal scale until its zero matches zero on the vernier dial. See figure 1, the numbers 3 and 4, on the illustration.
5. Release clamp screw and move the head 90°. This is at right angles to line A - A and locates line B - G.
6. With the 100-foot tape, measure off the distances I - B and B - G to establish building line B - G.
7. Repeat the operations in steps 1 through 6, setting up on corner B. Establish point C from B - G and tape the required measurement to C from B - G.
8. Establish point H in the same manner as prescribed and the building should be ready for batter boards. The offset D - E - F is easier to lay out by measuring with the tape from parallel lines.
9. This completes the unit on Wall and Building Layout, and you have come a long way, baby! So have the instructor evaluate

LEARNING PRACTICE (cont'd):

your work and get with another task package.

Keep laying out your effort, and you may have some day soon the opportunity to lay out a 30-story building.

LEVEL



General Description of Level

The 10½ inch long telescope with a built-in sunshade furnishes a sharp magnifying power of 18 times, and has an objective lens (1) of $^{15}/_{16}$ inch diameter. To focus on an object, turn the focusing knobs (2) in the proper direction, with either your right or left hand. No separate focusing of the cross-hairs is necessary, since they are in a fixed focus. The 1⅞ inch long telescope vial is protected by a strong die cast casing.

The fully enclosed, adjustable horizontal circle (3) is divided in degrees and numbered every 10 degrees in quadrants, from 0 degrees to 90 degrees. Various angles can be measured with the aid of the index vernier (4). Approximate horizontal settings are held firmly in place by means of a clamp screw (5). Fine horizontal settings can be made with the tangent screw (6).

The instrument is mounted on the tripod head by a center screw and cup in the tripod head assembly (not shown) which screws onto the protective die cast base assembly (7). At the lower end of the tripod's center screw, a hole is provided for the cord of the plumb bob, which is used to center the level-transit on a desired point.

Four leveling screws (8) level the instrument. When removing the instrument from the tripod, first loosen the four leveling screws before unscrewing the center screw.

Figure 1

LAYOUT USING TRANSIT

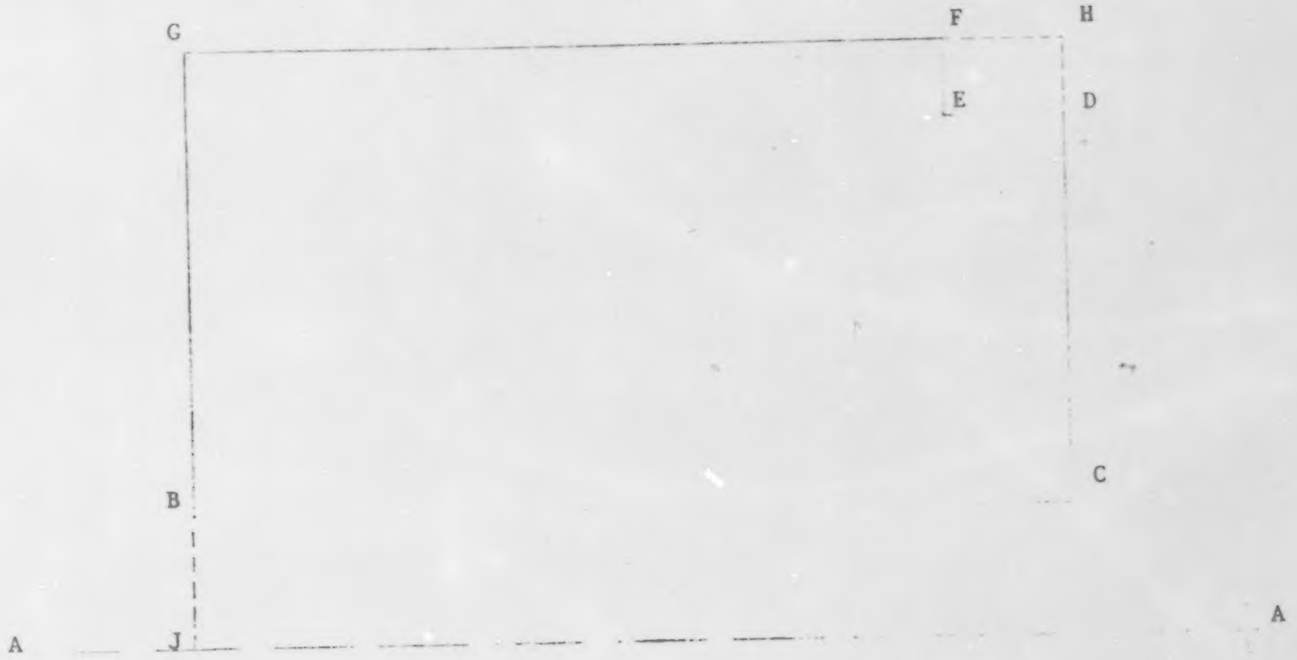

G
F
H
E
D
C
B
A
J
A

Figure 2

RESEARCH PROJECT

SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: MASONRY
COURSE: BRICKLAYING

UNIT PACKAGE XVI: FUNCTIONS AND USES OF MASONRY

PREREQUISITES: UNIT I, TASK PACKAGES 3 AND 4;
UNIT V, TASK PACKAGES 2 AND 4

RATIONALE:

Masonry walls and partitions for residences and other small buildings must be planned by taking in each and every requirement they must satisfy. Such planning institutes the selection of the particular kinds of walls or partitions to be used must be known and thoroughly understood by the mason or architect doing the planning. Both careful planning and good construction are necessary in order to make walls and partitions satisfactory in terms of safety as well as functional requirements. This unit explains the functions and uses of a foundation wall, a brick veneer wall, a brick and block wall, a partition wall, a curtain wall, a panel wall, a cavity wall and a parapet wall. The descriptions of a firewall, a coping and a buttress are also explained. Continue by reading the General Objectives for the unit and the Specific Objectives for each task package. Direct your attention to the Learning Activity which will indicate to you what you are to accomplish and how to proceed in the completion of this unit.

OBJECTIVES:

General:

Upon completion of this unit package you will be able to demonstrate a knowledge of the variety of walls and partitions used in masonry construction.

Specific:

Upon completion of the unit packages for this unit, you will be able to:

1. Record in writing the following information related to a foundation wall:

   a. 5 types of materials that are used in the construction of a foundation.

   b. 6 specifications for concrete foundations for small buildings.

   c. 4 types of foundation supports.

   Your performance will be evaluated in accordance with the instructor's checklist.

2. Record in writing the following information related to a brick veneer wall:

   a. name three types of walls that can be veneered.

   b. sketch two methods of preparing a new foundation for brick veneering a frame building.

   Your performance will be evaluated in accordance with the instructor's checklist.

3. Record in writing the following information related to a brick and block (tile) wall:

OBJECTIVES (cont'd):

a. state two advantages or reasons for constructing a brick and block wall in preference to a solid brick wall.

b. name two areas of use for a brick and block wall.

Your performance will be evaluated in accordance with the instructor's checklist.

4. Record in writing the following information related to a partition wall:

a. define a partition wall.

b. name 4 types of masonry material used in the construction of a partition wall.

Your performance will be evaluated in accordance with the instructor's checklist.

5. Record in writing the following information related to curtain and panel walls:

a. define a curtain wall.

b. define a panel wall.

c. name two methods using the panel wall in construction of a building.

Your performance will be evaluated in accordance with the instructor's checklist.

6. Record in writing the following information related to a cavity wall:

a. define a cavity wall.

b. name three areas of use for a cavity wall.

OBJECTIVES (cont'd):

c. state two reasons or advantages of using a cavity wall over using a solid brick wall.

Your performance will be evaluated in accordance with the instructor's checklist.

7. Record in writing the following information related to a retaining wall:

a. define a retaining wall.

b. name three [illegible] of use for a retaining wall.

c. describe proper construction of a retaining wall.

Your performance will be evaluated in accordance with the instructor's checklist.

8. Record in writing the following information concerning a parapet wall:

a. define a parapet wall.

b. sketch a section of parapet wall.

Your performance will be evaluated in accordance with the instructor's checklist.

9. Record in writing the following information related to a firewall, a wall coping and a buttress.

a. define each type of wall.

b. sketch a section of each.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

The task packages in this unit may be completed in any sequence that you may desire within the unit; there are nine packages for the unit. In the task packages you will be asked to view a sound-slide program, read assignments, answer questions and perform some practical exercises. The task packages contained in the unit by name and number are as follows:

TASK PACKAGE 1: FOUNDATION WALLS
TASK PACKAGE 2: BRICK VENEER WALLS
TASK PACKAGE 3: BRICK AND BLOCK WALLS
TASK PACKAGE 4: PARTITION WALLS
TASK PACKAGE 5: CURTAIN AND PANEL WALLS
TASK PACKAGE 6: A CAVITY WALL
TASK PACKAGE 7: A RETAINING WALL
TASK PACKAGE 8: A PARAPET WALL
TASK PACKAGE 9: IDENTIFICATION OF A COPING, A BUTTRESS AND A FIREWALL

At this point, should you feel able to pass a comprehensive test on the functions and uses of walls covered in this unit, contact your instructor. However, should you feel that you are not ready to be tested, begin your work as outlined above.

[illegible]-XVI-1

UNIT XVI: FUNCTIONS AND USES OF MASONRY

[illegible]: FOUNDATION WALLS

PREREQUISITES: NONE

RATIONALE:

Good foundations are long lasting. Build your masonry skills on a firm foundation and they will remain with you for a long time. The same is characteristic of foundations for structures, as you'll learn here.

Foundations are the key to the longevity of most structures. A properly designed and constructed foundation will be in useful condition for many years, and the foundation built on a rock will stand longer than those built on soft ground. You, yourself, should get a good foundation in your studies. Foundations of every type concern us every day, and here's your chance to learn about small building construction.

You will learn about kinds of material, types of support and specifications concerning concrete foundation wall thicknesses for small buildings. You are now ready to read the Objective, do the Learning Activity and complete the Learning Practice.

VE:

Upon completion of this task package you will be able to record in writing the following information related to a foundation wall:

3 types of materials that are used in the construction of a foundation.

Specifications for concrete foundations for small buildings.

[illegible] types of foundation [illegible].

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XVI-1, featuring Sir Found Ation.
2. Read pages 89 to 123 in Masonry Simplified, Volume II.
3. Observe figure 3, page 97; figure 13, page 103; figure 14, page 104; and figure 18, page 107, which illustrate different materials used in construction of foundations.
4. If possible, visit a construction site to observe the types of foundation supports in use.
5. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

1. Report to your instructor and discuss three types of materials that are used in the construction of a foundation.
2. In the specifications for concrete foundations, fill in the blank spaces with the wall thicknesses of the following structures, using information found on pages 109 and 110 of Masonry Simplified, Volume II.
   a. One-story residence constructed of wood frame with basement. The concrete foundation wall is at least ________ inches thick when the structure is over 20 feet long.
   b. Two-story residence constructed of brick veneer with wood frame. The concrete foundation wall is ________ inches thick when the foundation is 8 feet into the ground.
   c. Two-story apartment building constructed of masonry walls. The concrete foundation wall is ________ inches.
3. In the specifications for concrete foundations on pages 109 and 110 of Masonry Simplified, Volume II, name in writing the concrete foundation wall thicknesses of these six small buildings by filling in the blank spaces.
   a. One-story residence constructed of wood longer than 20 feet; the foundation thickness is ________ inches.
   b. Two-story residence constructed of brick veneer with wood

LEARNING PRACTICE (cont'd):

frame and the concrete foundation of 8 feet below grade; the foundation thickness is ________ inches.

c. Two-story apartment building constructed of masonry walls. The foundation thickness is ________ inches.

d. A 24-foot-long, one-story dairy barn constructed of wood frame: the foundation thickness is ________ inches.

e. Residence porch foundation wall thickness to be ________ inches.

f. Residence exterior stair walls to basement make wall at least ________ inches thick.

4. Name in writing four types of foundation supports used in the construction of a building. An example not included in the four types is the pillar foundations as constructed at the carpentry shop area to support the house your carpentry classmate will construct.

5. Take your answers to the instructor for evaluation and, with satisfactory grading, go on to the next task package.

A solid foundation is the key to success.

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 2: BRICK VENEER WALL

PREREQUISITES: UNIT I; UNIT V, TASK PACKAGES 2 AND 4

RATIONALE:

Don't climb the walls. Just brick veneer them. You'll learn how to do it here.

Walls have been an important part of man's existence since very early history. He has used them to protect himself and his family and furnishings from the elements.

The modern wall serves the same functions are those built in the past; improved construction techniques and the introduction of new materials have resulted in structures which are vastly superior. In the brick veneer wall of this task package the development of the metal wall ties enables the brick veneer on different types of back-up wall to be constructed to resemble a solid brick wall, but to retain the advantages of economy and better insulation qualities. Now continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information related to a brick veneer wall:

a. name three types of walls that can be brick veneered.

b. sketch two methods of preparing a new foundation for brick veneering a frame building.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM ________________, featuring B.V. Wall.
2. Read page 15, Bricklaying Vocational Training, section Metal Ties, observing three types of back-up walls used in brick veneering from the types of wall ties employed in structurally bonding the brick veneer to the back-up wall.
3. Read pages 363 and 364 in Masonry Simplified, Volume II. Study carefully the illustrations in figure 43, page 364.
4. Proceed to the Learning Practice, having completed the Learning Activity.

LEARNING PRACTICE:

1. Obtain paper from the instructor to record in writing the answers to the following statements.
    a. What type of back-up wall uses corrugated wall ties nailed to studs?
    b. In brick veneering an office building using dovetail wall ties, what is the type of back-up wall used?
    c. Another type of back-up wall was constructed using 4" x 8" x 16" masonry units with embedded corrugated wall ties. Due to reasons of economy, the brick veneer was not to be laid up immediately. What is the back-up wall constructed of?
2. Refer to the reading on page 363 and the illustration of Figure 43 on page 364 in Masonry Simplified, Volume 11. Sketch two methods for providing foundations for brick veneer over old frame walls.
3. Can you believe you did the whole task package? Well, you did. Give your work to the instructor so he can evaluate it.

You're really scaling the walls toward success as a mason.

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 3: BRICK AND BLOCK WALLS

PREREQUISITES: UNIT I, TASK PACKAGES 3-4

RATIONALE:

Some walls are necessary for protection. Our homes and other buildings contain such walls. They protect our lives and property from weather and other possibilities. Many of the walls are of brick and block, as you see here.

In examining the permanent buildings on the high school campus, you will observe the greater number to be brick and block construction. The brick wythe is on the exterior and the block wythe on the interior of the same wall. These two materials, when used in this manner, become a single wall due to the structural bonding employed while under construction.

Although brick and block wall construction is used for residential purposes, most of this type of construction is in commercial work, such as schools, churches, office buildings, and shopping center buildings. This fact is mainly due to the economy of material, rate of installation of the material, and the preparation of the interior block part of the wall to be a finished wall. After reading the Objective, do the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information related to a brick and block (tile) wall:

a. state two advantages or reasons for constructing a brick and block wall in preference to a solid brick wall.

b. name two areas of use for a brick and block wall.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XVI-3, starring Bricky Block.
2. Read page 341 in Masonry Simplified, Volume II.
3. View figure 1 in this task package of a sectional view of a brick and block wall.
4. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper list in writing two advantages or reasons for constructing a brick and block wall in preference to a solid brick wall that you studied in the reading assignment on page 341, Masonry Simplified, Volume II.

LEARNING PRACTICE (cont'd):

2. Name in writing two areas of use for a brick and block wall of a structure that you studied in the reading assignment on page 341, Masonry Simplified, Volume II.
3. When you feel you are ready for an evaluation, go to the instructor to have the learning practice evaluated. Discuss with him other possible areas of use of the brick and block wall in construction of a building not listed in the textbook.
4. Observe figure 1 on a sectional view of a brick and block wall.

Brick and block will break your bones, but in a wall they give strength, character, and beauty. That is what you're doing for yourself. Get another task package.

Wythe by wythe, you build a solid career in masonry.

BRICK AND BLOCK SECTION

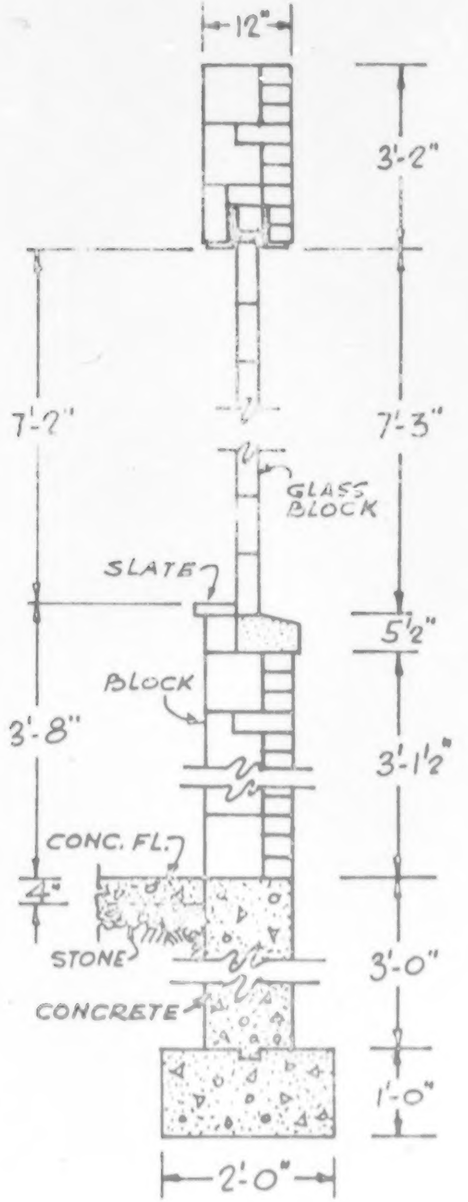

12"
3'-2"
7'-2"
7'-3"
GLASS BLOCK
SLATE
5½"
BLOCK
3'-8"
3'-1½"
CONC. FL.
4"
STONE
3'-0"
CONCRETE
1'-0"
2'-0"

Figure 1

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 4: PARTITION WALLS

PREREQUISITES: NONE

RATIONALE

Are you artistically inclined? If you are, the construction of partition walls will allow you to exercise your artistic talents in masonry. Who knows? You may become the Picasso of the partitions.

In the construction of all buildings, except the one-room variety, partition walls become very important members of those buildings. There are many different masonry materials employed in the construction of a partition wall, with many varieties of design in using the material. This is another area of masonry construction where you as a mason may call on your artistic abilities to create many different effects. This type of partition is a non-load bearing wall; that is, it will not carry any structural load upon it.

The other type of a masonry partition wall is the load-bearing wall, and it must be constructed according to the local building code regulations. Now read the Objective and do the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information related to a partition wall:

a. define a partition wall.

b. name 4 types of masonry material used in the construction of a partition wall.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM ______________, a triple-action feature.
2. Read Masonry Simplified, Volume II, pages 318, 319, 328, 341, 342, 345, and 356, sections on partitions.
3. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper write the definition of a partition wall; refer to the reading assignment on pages 318 and 319, Masonry Simplified, Volume II.
2. Name in writing 4 types of masonry material used in the construction of a partition wall; you studied this information

LEARNING PRACTICE (cont'd):

in the reading assignment on pages 328, 341, 342, 345 and 356, sections on partitions.

3. Discuss with a classmate some unique designs you may develop in using a different material for a partition wall.

4. When you feel you are ready for an evaluation by the terms of the Objective, take the Learning Practice to the instructor.

5. On the instructor's acceptance of your performance, you will be ready for another task package. So on the mark, get set and go for the next goal.

You're the budding Picasso of the partition walls.

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 5: CURTAIN AND PANEL WALLS

PREREQUISITES: NONE

RATIONALE:

It's not curtains here - but curtain and panel walls. Learn about these two types of interesting masonry walls.

The use of a structural-steel skeleton or framework for many buildings has been common practice for a long time. In this type of building the structural-steel skeleton is erected, and then the curtain-wall masonry is laid up to fill in the exterior wall sections of the building.

The panel wall was developed as a means of saving appreciable amounts of material and labor, over the solid brick wall. The use of panel walls is generally limited to one story structures; such walls are also used as garden walls. If you have an opportunity to visit Charleston, South Carolina, go to Rainbow Row and see the beautiful brick homes with their panel-constructed garden walls.

Continue by reading the Objective, and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information related to curtain and panel walls:

a. define a curtain wall.

b. define a panel wall.

c. name two methods using the panel wall in the construction of a building.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM __________, starring Curt Panel.
2. Study the definitions on page 61 in the Glossary Terms of Bricklaying Vocational Training.
3. Read and study page 331 and the illustrations of figure 15 on page 332, Masonry Simplified, Volume II.
4. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

1. On a separate sheet of paper state in writing the responses to the following:

LEARNING PRACTICE (cont'd):

2. The definition of a curtain wall, from the reference you studied in Bricklaying Vocational Training, page 61 of the Glossary.
3. The definition of a panel wall, the reference you studied in Bricklaying Vocational Training, page 61 of the Glossary.
4. Two methods of using panel walls in building a structure.
5. Take the sheets of paper with your references to the instructor for evaluation in accordance with his checklist.
6. In your masonry shop there are curtain and panel walls not of masonry; discuss these with your instructor.

With the number of different types of walls in this unit, one could get wall-eyed.

If you know your walls, you can scale them to success.

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 6: A CAVITY WALL

PREREQUISITES: NONE

RATIONALE:

Cavities have their advantages -- when they're associated with cavity walls. Learn about cavity walls here.

The cavity wall may be used in most one or two-story buildings if the builder or owner so desires. Its resistance to rain penetration is the most outstanding feature of the cavity wall, with its 2" minimum cavity space and proper drainage holes (weep holes) at the bottom of the wall to divert out any moisture penetrating the upper member of the wall. The cavity wall also acts as a barrier to sound and has a better insulation value than solid masonry. An improvement of over 25 percent in insulation value was found for unventilated cavity walls compared with solid walls of the same masonry material. In this task package you will learn the identification of and the areas of use and advantages of employing cavity masonry walls over solid masonry walls. Now continue with the Objective, and do the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information related to a cavity wall:

a. define a cavity wall.

b. name three areas of use for a cavity wall.

c. state two reasons or advantages of using a cavity wall as using a solid brick wall.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM ______________________, starring Mr. Cavity.

2. Read page 61, Bricklaying Vocational Training, in the Glossary Terms.

3. Read pages 336 and 360, Masonry Simplified, Volume II, section Cavity Wall.

4. Also read pages 177 to 179, Masonry Simplified, Volume I, section Cavity Wall.

5. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper record in writing the definition of a cavity wall; the reading you studied on page 61 of Bricklaying Vocational Training will be helpful.
2. Name in writing three areas of use for a cavity wall; refer to the reading material you studied in Masonry Simplified, Volume II, pages 336 and 360, and pages 177 to 179, Masonry Simplified, Volume I.
3. On a sheet of paper, state in writing two advantages of using a cavity wall over a solid brick wall.
4. Take your responses to the instructor for the evaluation in terms of the Objective.

You're on your way to saying, "Look, Ma, what beautiful cavities!" Oh, I mean cavity wall of course.

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 7: A RETAINING WALL

PREREQUISITES: NONE

RATIONALE:

Have you retained all your masonry knowledge to this point? Good. You are better than any retaining wall, even if you do have one thing in common with it. Study the retaining wall here.

As one becomes more aware of masonry walls he will observe the use of these walls with greater appreciation. A retaining wall is not too much different to construct from other masonry walls; but its location and the added precautions to be considered in the construction are important. Since a retaining wall does what the word retaining means, holds back or keeps, you will observe retaining walls built along driveways, sidewalks, terraces, and around trees, as you drive throughout the city. In the construction of the retaining wall, it is necessary to take into account the front line from finish grade to bottom of the footer, thickness of well to the height of the wall, and a good drainage system to allow water behind the wall to drain away to relieve the water pressure that is a cause of deterioration for many retaining walls. Now continue with the Objective and do the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information related to a retaining wall.

a. define a retaining wall.

b. name three areas of use for a retaining wall.

c. describe proper construction of a retaining wall.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM____________, featuring Perry Masonry.
2. Read pages 24-27 in Plan Reading for Brickmasons. Observe the illustrations of the retaining walls of the types of tree protection varieties. Observe in figure 5, page 24, the sectional view of the retaining wall where the symbols of brick, gravel and earth are used.
3. Read and study the Technical Notes on information sheets numbers 1 through 4 in this task package.
4. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper, state in writing the definition of a retaining wall in the reading assignment, page 24, Plan Reading for Brickmasons.
2. Name in writing three areas of use for a retaining wall from the reading assignment.
3. On a sheet of paper describe in writing the proper construction of a retaining wall from the information sheets 1 through 4, Technical Notes, in this task package.
4. When you feel you are ready for the evaluation take the sheets of paper with the responses on them and give them to the instructor.
5. When the instructor is satisfied with your performance, in accordance with the Objective, he will give you the green light for another task package. Go! Go! Go!

Retain all your masonry skills for happiness and prosperity.

Technical Notes ON BRICK & TILE CONSTRUCTION

STRUCTURAL CLAY PRODUCTS INSTITUTE

THE DESIGN OF REINFORCED BRICK MASONRY RETAINING WALLS

INTRODUCTION

One of the most effective uses of reinforced brick masonry is for the construction of retaining walls, abutments, and other structural components designed to withstand lateral pressure from earth. Adding reinforcing steel allows the designer to greatly reduce the mass, and hence the cost of such walls and their foundations. At the same time it is possible to create a wall which, when finished, will have an integral surface, the color and texture of which will harmonize with other structures in the area.

Probably the most common sizes of earth retaining walls range from 3 to 6 ft. in height. For that reason, a chart to facilitate the design of walls of these heights has been included for reference. Walls up to 6 ft. in height are often used to maintain a change in grade at property lines or to restrain earth in a fill for a drive or roadway. Such walls may be used in basement construction (where no lateral support is offered by the structural system above), or in the construction of swimming pools or open tanks, basins or bins of various kinds. RBM retaining walls are also of great value to the landscape architect as terrace walls, garden walls without pilasters and other features of his work.

DESIGN OF LOW WALLS

Table 1, page 2 may be used for the design of walls not over 6 ft. in height. Because a retaining wall—even a low one—can be subjected to a wide variety of loading conditions, two classifications of walls are listed. They are "M" or medium-duty walls and "H" or heavy-duty walls.

Medium-duty walls may safely and economically be used where all of the following conditions exist:

1. The slope of the surface of the back fill is less than 3 to 1.
2. There is no surcharge from wheel loads or bearing from foundations of structures above closer to the back of the wall than 1½ times its height.
3. The soil is not dense and can be well drained.

Fig. 1

Masonry retaining walls are widely used in residential work. Note the weep holes formed by clay pipe.

Heavy-duty walls should be used where any of the following conditions exist:

1. The slope of the surface of the back fill is 3 to 1 or steeper.
2. Driveways or foundations for buildings exist or are planned within a distance behind the wall of less than 1½ times its height.
3. The soil is very dense clay or a combination of clay, silt and rocks, and presents a drainage problem.

Fig. 2 shows construction details for the low RBM retaining walls covered in Table 1. It will be noted that there are alternate details indicating a concrete foundation in addition to the masonry one. Individual job conditions will determine which type of foundation is more economical. The speed, due to continuity of construction, and lack of formwork would probably dictate the use of a masonry foundation on the smaller jobs; while for the larger or longer walls a concrete foundation is often used.

No matter which foundation is used, the dimensions must be no less than those shown, since sufficient mass is needed to overcome a sliding tendency resulting when a structure is subjected to horizontal forces.

The position of the stem on the footing is determined by the minimum dimension "x". In the heavy-duty walls, because of the excessive loading, the eccentricity of the resultant forces acting on the base must be controlled. Therefore, the stem must not be placed as far out on the footing as in the medium-duty walls.

MORTAR

In the construction of retaining walls or other masonry, plain or reinforced, which will be subjected to appreciable weathering or moisture conditions, careful attention must be given to the quality of mortar used. It should consist of portland cement, hydrated lime or lime putty, and aggregate and should conform to the requirements for Type A-1 or A-2 mortar of Tentative Specifications for Mortar for Unit Masonry, (ASTM C270-). Type A-1 mortar consists of the following proportions (by volume): 1 part portland cement, ¼ part lime, and between 3 and 3¾ parts sand. Type A-2 mortar consists of 1 part portland cement, ½ part lime, and between 3½ and 4½ parts sand.

Grout used in bonding the reinforcement should be of the same proportion as the mortar, except that pea gravel equal to not more than 2 parts by volume of the portland cement may be added. Such pea gravel should be graded with not more than 5 per cent passing the No. 8 sieve and with not less than 95 per cent passing the ⅜-inch sieve. When adding the additional water to facilitate pouring the grout, caution should be used to prevent the addition of too much water which will result in segregation of the grout components.

WORKMANSHIP

Since reinforced grouted brick masonry is considered homogeneous, care should be used in its construction to insure complete bond. Both the front and rear wythes of masonry should be laid with full head and bed joints, and furrowing of the bed joints should not be permitted. It is considered good practice to slope the top of the bed joint mortar toward the center of the wall in order to minimize the amount of mortar forced into the grout space when the brick is shoved into line.

One of the wythes or tiers of masonry may be built up 3 courses before grouting, but the other should not be built up more than 1 course above the grout. Each pour of grout should stop no higher than 1½ inches from the top of the masonry and should be puddled with a wooden puddler to insure complete bond with no voids. When pouring the grout, care should be taken to see that none is spilled on the face of the wall, since the resulting stains will add to the cleaning problem when the wall is finished.

When back filling is done, it is important to see that earth is placed first in front of the foundation and well tamped before replacing the earth behind the wall. The depth to the frostline or adequate bearing will determine the distance below the finished grade to which the foundation should extend.

TABLE 1

STEEL REQUIRED FOR LOW RBM RETAINING WALLS.

WALL HEIGHT (H)	BASE WIDTH (W)	LOADING	MIN. DISTANCE (x)	VERTICAL BARS (a)	HORIZONTAL BARS (b)	BASE REINFORCING	
						(c)	(d)
3 Feet	1'-9"	M	4"	#3 @ 24"	2—#4	2—#2	#3 @ 20"
		H	6"	#3 @ 15"	2—#4	2—#2	#3 @ 20"
4 Feet	2'-5"	M	7"	#3 @ 24"	3—#4	2—#2	#3 @ 20"
		H	9"	#4 @ 18"	3—#4	2—#2	#3 @ 20"
5 Feet	3'-0"	M	10"	#3 @ 15"	3—#4	2—#3	#3 @ 15"
		H	12"	#4 @ 12"*	3—#4	2—#3	#3 @ 15"
6 Feet	3'-7"	M	13"	#4 @ 15"	4—#4	2—#3	#4 @ 15"
		H	16"	#4 @ 8"*	4—#4	2—#3	#4 @ 15"

* Alternate bars may be cut off at one-half wall height.

Design Factors:
Allowable stress in steel (f_s): 20,000 psi
Allowable compression in masonry (f_m): 650 psi
Allowable soil bearing: 2000 psf

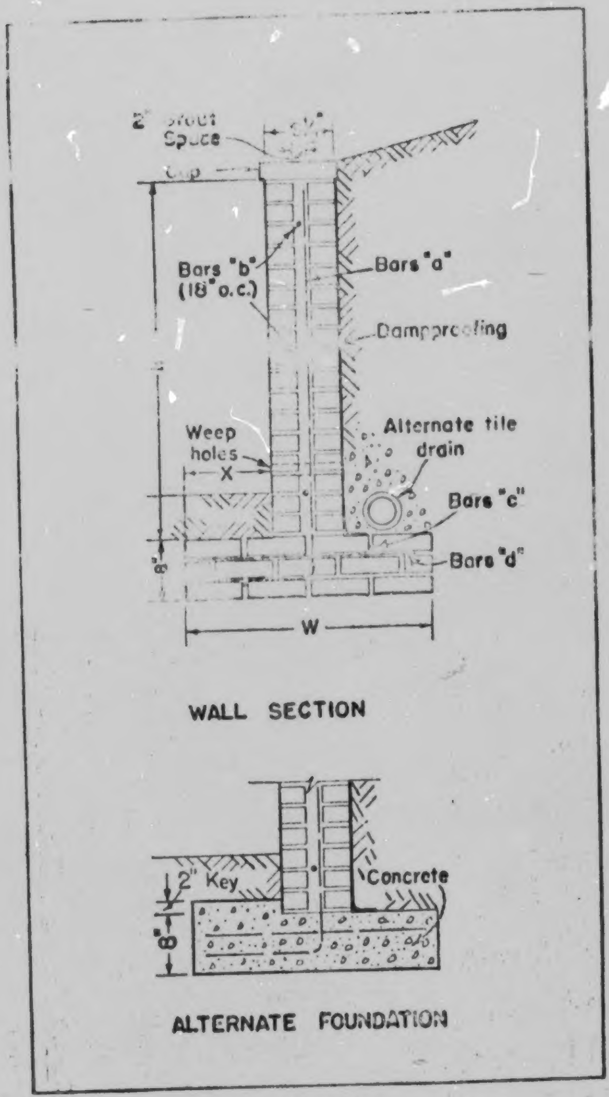


Fig. 2
Wall section showing steel placement.

DRAINAGE

An important factor in the successful design of a RBM retaining wall of any type is the provision for adequate drainage. Earth which has become saturated with moisture has a tendency to exert much more severe pressure on the wall and can also cause structural damage through successive freezing and thawing cycles. For this reason, weep holes should be placed at intervals above the finished grade in front of the wall.

Weep holes used in retaining walls should be larger than those normally used in building construction. Often the best practice is to omit half a brick and substitute a piece of oiled 2 x 4 (slightly tapered) through the entire wall which can then be removed after the grout has sufficiently set. Another detail frequently used is the permanent installation of a 3- or 4-inch clay drain tile. The spacing of these weep holes will depend on the drainage problem and the density of the soil.

Another method of removing water from the back fill is the installation of a continuous drain behind the wall at the base of the stem. Such a drain, often called a "French Drain", should be surrounded by a pervious material, such as gravel or crushed stone, and should be laid with open joints. When a continuous drain is used, it may be designed to drain through weep holes to the face of the wall or it may be drained into an underground sewer, if one is available.

As insurance against seepage through the wall which may possibly cause efflorescence at a later date, the back of the wall should be dampproofed in the following manner: a ½-inch troweled on parging coat should be applied, bevelled at the top and coved out at the base. After the parging has set for at least 7 days and when the surface is dry, it should be covered with a dampproofing consisting of one coat of creosote oil and two coats of coal tar pitch. The pitch should be heated to flow freely but not above 350 degrees.

Back fill placed directly behind the wall should be of crushed rock or gravel if the soil is too dense to provide rapid drainage.

DESIGN OF LARGER WALLS

In the design of a retaining wall of any type, certain procedures must be followed. One of the first steps, after determining conditions of the site and the required height of the wall, is to compute the thrust exerted by the bank of earth behind the wall. Three things must be established: (a) the amount of the force, (b) its point of application, and (c) its line of action or direction.

There have been through the years a number of empirical and mathematical investigations made to determine approximately such forces. C. A. Coulomb, as early as 1773, published a paper dealing with earth pressures against retaining walls. Coulomb's theory, supported by laboratory and field observations, is still a basis for ingenious graphical solutions currently in use. Another theory extensively employed was first proposed by W. J. M. Rankine in 1858. Since refined, it is the basis for the design charts used in this paper.

Following are the steps, in their normal sequence, for the design of a reinforced brick masonry retaining wall:

1. Choose tentative proportions and dimensions for the structure, including the stem, base, and position of the stem on the base.

2. Calculate thrust exerted by the earth.
3. Take moments of all forces acting about a point (usually the heel of the base) to determine the stability of the wall against overturning.
4. Check the maximum foundation pressure at the toe of the base against the allowable soil bearing pressure.
5. Check the factor of safety against sliding.
6. Make a structural design of the cantilevers comprising the stem, and both the toe and heel of the base.

The above steps have been followed in the preparation of the data in Table 1. In all cases, conservative values for allowable unit stresses have been used. In actual practice, when not using the chart, allowable soil bearing pressure should be investigated and the design should also comply with limitations imposed by local building regulations.

A more detailed explanation of a step-by-step procedure for the design of larger RBM retaining walls will be published at a later date.

CONCLUSION

In the foregoing, an attempt has been made to introduce and outline a simple method for the successful design of small and moderate size RBM earth retaining walls. In Table 1 and accompanying details, only one type of wall has been considered, the "T" wall which is designed as a cantilever supported on a base which itself is composed of 2 cantilevers. There are, however, many different applications of retaining walls. Certain cellar or foundation walls built to withstand considerable earth pressure may be so considered. In such cases, the wall is usually considered as a vertical beam, supported at the top by the first floor construction and at the bottom by the cellar floor slab.

Other variations include abutments for highway and railroad bridges. The current trend toward the more extensive use of grade-separation intersections on modern express highways gives the designer an additional field in which to work. It is an established fact that due consideration given to esthetics and landscaping in the design of highway structures results in less driver fatigue. Its attractiveness and low construction cost makes RBM an excellent medium for such work.

While information contained in this and other sources will facilitate the design of most retaining walls, for extensive or unusual projects, it is recommended that the services of an experienced engineer be utilized. Walls of more than 15 to 20 ft. in height or those with difficult soil conditions demand the services of an expert trained in soil mechanics.

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 8: A PARAPET WALL

PREREQUISITES: NONE

RATIONALE:

A parapet is not a parakeet which is a real pet. A parapet is a particular type of wall, having a special use. Study it here.

Parapet walls are rarely used on a structure that has a steep, sloping roof. They are employed as wall sections above the roof line of buildings that have flat or nearly flat roofs. The parapet wall is that section of the wall built up somewhat higher than the roof. This type of construction is usually found on apartment buildings, store buildings, and some styles of houses.

The comparative instability of the parapet wall is of concern because of the danger to life and surrounding property in the event of damage to it during windstorms or earthquakes. For this reason, building codes regulate the height of a parapet wall. In this task package you will learn what a parapet wall is and be able to relate the details of one with a sketch. Continue with the Objective, doing the Learning Practice after completing the Learning Activity.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information concerning a parapet wall.

a. define a parapet wall.

b. sketch a section of parapet wall.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM__________, starring Parry Petwall.
2. Read pages 319 and 320, Masonry Simplified, Volume II. Observe figure 4, page 320, of section entitled Parapet Walls.
3. Read pages 233 and 234, Masonry Simplified, Volume I, section Parapet Walls; observe figure 29, page 235.
4. Study the definition, page 61, Bricklaying Vocational Training.
5. This completes the Learning Activity; now do the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper state in writing the definition of a parapet wall you studied in the reading assignment, page 61, Bricklaying Vocational Training.
2. Sketch a section of a parapet wall as illustrated in figure 4, page 320, Masonry Simplified, Volume II, and figure 20.
3. Discuss with a classmate one of the buildings in the downtown area that has a parapet wall.
4. When you feel you are ready for an evaluation in terms of the Objective, have the instructor evaluate your responses.
5. When the instructor is satisfied with your performance in knowing the parapet wall, start another task package.

A packet learned is a packet earned.

UNIT XVI: FUNCTIONS AND USES OF MASONRY

TASK PACKAGE 9: IDENTIFICATION OF A COPING, A BUTTRESS AND A FIREWALL

PREREQUISITES: NONE

RATIONALE:

Are you ready to cope with the firewall and the buttress? Okay, start coping right here.

In masonry construction you will be involved in the building of a firewall if you work on the construction of apartment and shopping center buildings that adjoin each other.

Wall coping is a variety of masonry materials used on the top of retaining walls, parapet walls, and walls of similar nature to prevent the water from penetrating into the intersection of the walls.

A buttress is employed to give added strength to a long exterior wall in the same manner as a pilaster is used for an interior wall. The advantages of the buttress are that the inside face of the wall is straight, free of projections, and acts as the stabilizer of a long wall on the outside of a building. The design of the buttress and distance from center to center of each are dependent on the structural loads the wall has to carry. Read the Objective and complete the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to record in writing the following information related to a firewall, a wall coping, and a buttress;

a. define each type of wall.

b. sketch a section of each.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM ____________, featuring F. C. buttress.
2. Study definitions on pages 58 and 61, Bricklaying Vocational Training, of coping and firewall.
3. Study the definition, page 16 in the back of Masonry Simplified, Volume I, of buttress.
4. Read and study pages 320-322, sections Wall Coping, Buttress in Walls, and Fire Resistance of Brick Walls and Partitions. Observe figure 4, page 320, and figure 6, page 321, Masonry Simplified, Volume II.
5. This completes the Learning Activity; now do the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper state in writing the definitions of a coping, a firewall, and a buttress based on the reading assignment on pages 60 and 61, Bricklaying Vocational Training, and page 16 of Masonry Simplified, Volume 1.

2. Opposite or below each definition of a coping, a firewall and a buttress, make a sketch of each.

3. When riding around town with your friends, point out to them some of the building situations that use a coping, a firewall and a buttress.

4. Take your responses to the instructor for evaluation according to his checklist. Masons need competencies. Task packages giv you these.

Cope with yourself first - and then you can cope with success.

RESEARCH PROJECT
SANFORD CENTRAL HIGH SCHOOL
1708 NASH STREET
SANFORD, NORTH CAROLINA 27330

CLUSTER: MASONRY
COURSE: BRICKLAYING

CE003932 (a)

UNIT PACKAGE XVII: READING BLUEPRINTS TO BUILD STRUCTURES ACCORDING TO PLANS AND SPECIFICATIONS

PREREQUISITES: UNIT I, TASK PACKAGE 5; UNIT VII, TASK PACKAGES 1-8; UNIT XVII, TASK PACKAGES 1 and 2

RATIONALE:

Every mason should know how to read blueprints so that he can quickly and accurately translate the information on the blueprint into his part of the actual building. The mason must not only know about his part of the work but also about how the work of the other trades fits in with his work. To read blueprints accurately, you must learn to interpret the information and directions which are drawn or written in the specifications and blueprints. Only by study and practice is this possible. You must learn to recognize lines, dimensions, symbols, abbreviations, and notes which an architect uses to convey the information and directions needed to construct a building successfully. You must read blueprints accurately for mistakes mean a loss of time and money. Continue by reading the General Objectives for the unit and the Specific Objectives for the individual packages. Proceed to the Learning Activity which will supply the information of what you are to do.

OBJECTIVES:

General:

Upon completion of this unit package you will be able to interpret blueprints and specifications for masonry construction.

Specific:

Upon completion of the task packages for this unit, you will be able to:

1. Correctly name in writing, from given illustrations, the following:
    a. 6 basic types of architectural lines.
    b. 8 commonly used types of architectural symbols.
    c. 8 commonly used masonry abbreviations.

    Your performance will be evaluated in accordance with the instructor's checklist.

2. Interpret a commercial building plan by recording in writing the following:
    a. dimensions.
        (1) walls.
        (2) footings.
        (3) elevations.
        (4) doors.
    b. material.
        (1) exterior walls.
        (2) interior walls.
        (3) ceilings.

OBJECTIVES:

Your performance will be evaluated in accordance with the instructor's checklist.

3. Orally discuss types of material and standards of bricklaying that relate the building specifications, using the Specifications for Clay Products on page 8 of Plan Reading for Brickmasons as a guide.

4. Perform the following:
   a. design and sketch a plan view (first course) and four elevation views of a simple outdoor fireplace.
   b. build an outdoor fireplace that you designed in statement a, using appropriate masonry standards.

   Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

There are four task packages in this unit and they should be completed in numerical order until you have completed all the units. As an example, it would be difficult to read a set of blueprints of a small house if you did not know the lines, symbols, and the abbreviations which the architect uses as the language of the blueprints. In the task packages you will look at a sound-slide program, read assignments, and perform practical exercises. The titles of the task packages contained in the unit are:

LEARNING ACTIVITY (cont'd):

TASK PACKAGE 1: LINES, SYMBOLS AND ABBREVIATIONS

TASK PACKAGE 2: INTERPRETING BUILDING PLANS

TASK PACKAGE 3: INTERPRETING BUILDING SPECIFICATIONS

TASK PACKAGE 4: DESIGNING, SKETCHING AND BUILDING FIREPLACE

Upon completion of the Learning Activity, proceed with the work as outlined above. If you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT XVII: READING BLUEPRINTS TO BUILD STRUCTURES ACCORDING TO PLANS AND SPECIFICATIONS

TASK PACKAGE 1: LINES, SYMBOLS, AND ABBREVIATIONS

PREREQUISITES: NONE

RATIONALE:

Line up your symbols and abbreviations. Get your brain in motion. Now, call the plays on this task package.

A skilled brick mason is one able to perform work without constant supervision, much like the quarterback who runs his team without the coach sending in every play. He is able to follow directions and carry out orders to their completion without requiring a foreman or supervisor to interpret and explain each step of the job. Most of his assignments are on paper, but in a different form than you may be accustomed to; either in the form of a drawing or in writing. For a very small building it would take an average size textbook to write all the details needed for construction. Instead of that, the architects have established plans and specifications for the craftsman to follow. Lines, symbols, and abbreviations play a great part in the interpretation of plans, so this is where we'll start this task package. Your success with this task package can "line" you up to be a "symbol" for your comm. (abbreviation).

OBJECTIVE:

Upon completion of this task package you will be able to correctly name in writing from given illustrations the following:

a. 6 types of architectural lines.

b. 8 types of architectural symbols.

c. 8 architectural abbreviations.

Abbreviations shown on pages 3 through 7 in Plan Reading for Brickmasons. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XVII-1, starring Mr. Abbreviation.
2. Read and study pages 2 through 7 in Plan Reading for Brickmasons, by Structural Clay Products Institute. It is necessary to learn the lines, symbols, and abbreviations to be able to understand plan reading.
3. At the end of your Learning Activity have the instructor give to you a set of drawings with specifications and see if you can point out to him the following lines and symbols from the plans and abbreviations from the specifications:

    a. Dimension line

    b. Center line

    c. Invisible line

LEARNING ACTIVITY (cont'd):

d. Extension line

e. Section line

f. Brick symbol

g. Block symbol

h. Concrete symbol

i. Abbreviation for concrete block

j. Abbreviation for footing

k. Abbreviation for section

4. Proceed to Learning Practice if confident of the Learning Activity.

LEARNING PRACTICE:

1. Using figure 1 in this task package, record in writing the names of all the lines in the blank ~~spaces~~ provided.

2. Using figure 2 in this task package, record in writing the names of all the symbols in the blank spaces provided.

3. From the list of items, write in the abbreviation for each in the blank spaces:

a. Brick ____________________

b. Center to center ____________

c. Column ____________________

d. Concrete block ____________

e. Elevation ______________

f. Footing ________________

g. Masonry opening _________

h. Partition ______________

4. Learning to read blueprints is much like building a house after the excavation is made, from the footer upwards, or from the lines, symbols and abbreviations to the completed plans.

LEARNING PRACTICE (cont'd):

5. Give the sheets of answers to your instructor for evaluation.

Go line up for a symbolic new task package.

Line yourself up so that you will become the symbol for success.

TYPES OF LINES

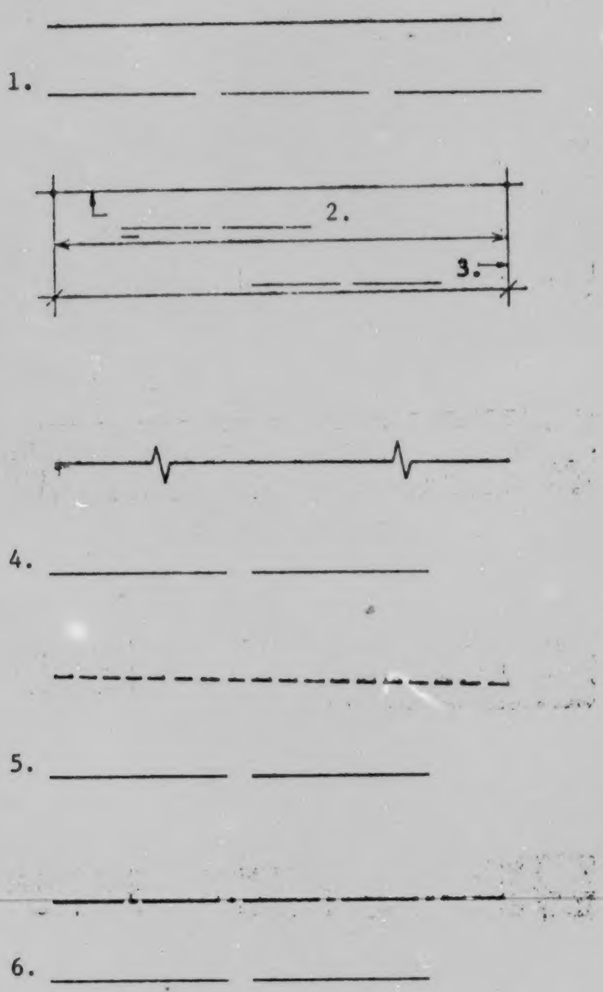


Figure 1

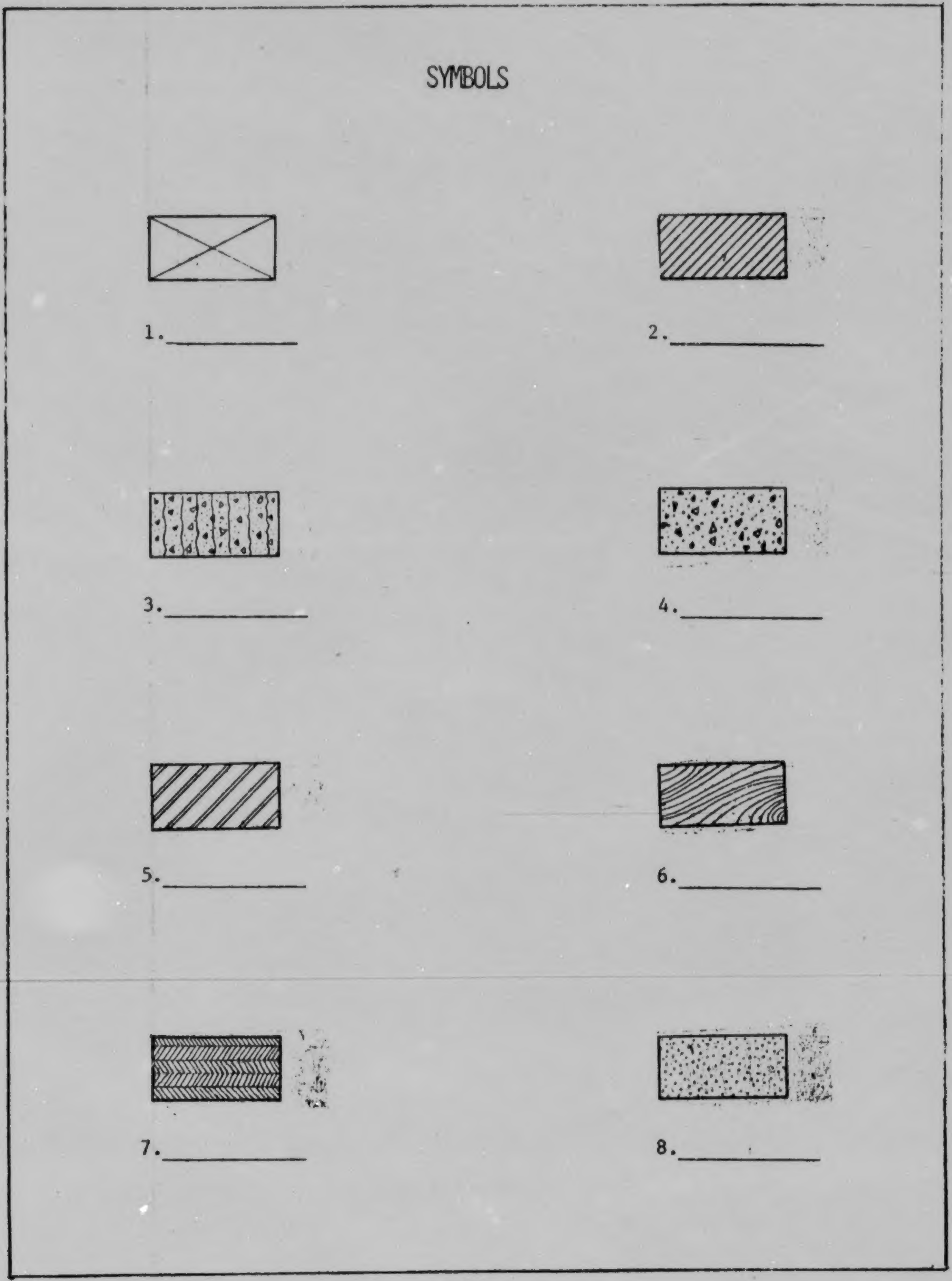

SYMBOLS
1.
2.
3.
4.
5.
6.
7.
8.

Figure 2

UNIT XVII: READING BLUEPRINTS TO BUILD STRUCTURES ACCORDING TO PLANS AND SPECIFICATIONS

TASK PACKAGE 2: INTERPRETING BUILDING PLANS

PREREQUISITES: UNIT XVII, TASK PACKAGE 1

RATIONALE:

To construct a building as it was planned, with the cooperation of the owner and architect, all of the skilled workmen must know how to read blueprints (plans). When every man knows what he must do and does his part of the work correctly, then the building will be completed with all the specified parts and materials fitted into their proper places.

Every mason should know how to read blueprints so that he can quickly and accurately translate the information on the blueprint into his part of the actual building. A mason not only knows his part of the work but also about how the work of the other trades fits in with his work. This is what this task package is all about. If you are one of the many that do not care for a great deal of reading, then take the bull by the horns and put the Objective to work after going through the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to interpret a commercial building plan by recording in writing the following:

a. dimensions
    1. walls
    2. footings
    3. elevations
    4. doors
b. material
    1. exterior walls
    2. interior walls
    3. ceilings

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XVII-2, starring Mr. Blueprint.
2. Read and study pages 6 and 7 of Plan Reading for Brickmasons. Begin with the section on the Building Plans, page 6 through page 7.
3. The ideas recorded on the plans will show:
    a. size of the building
    b. shape of the building

LEARNING ACTIVITY (cont'd):

c. materials used to construct the building

d. walls and partitions

e. arrangement of the rooms, hallways, stairs and closets

f. location of doors, windows, fixtures and equipment

g. dimensions

h. how the building will look

4. Read pages 8 through 14, 17 through 22, and 31 through 38 in Building Trade Blueprint Reading, by Sundberg.

5. Refer to Sheets 2, 3 and 4 of the United States Post Office Building.

6. If you have studied the material in the Learning Practice thoroughly and it is not clear in your mind, it's time to check with your instructor. If it is clear, proceed to the Learning Practice.

LEARNING PRACTICE:

1. Refer to the drawings of the United States Post Office Building on Sheets 2, 3 and 4 in Plan Reading for Brickmasons, to be used in completing this following assignment and record your answers in the spaces provided. When finished, have your instructor evaluate your work. Answer questions using Sheet 2 drawings.

a. How wide is the footing for the building? ________________

b. How thick are the building walls? ________________________

LEARNING PRACTICE (cont'd):

c. What masonry materials are in the exterior walls?

____

d. What masonry materials are in the interior walls?

____

e. What is the wall finish of the mail vestibule?

____

2. Answer questions using Sheet 3 drawings.

a. What is the dimension from the top of the floor slab to the top of the bond beam? ______________________________

b. What is the size of the doors in the east elevation?

____

c. What is the dimension from the bottom of the windows to the top of the finished floor slab in the west elevation?

____

3. Answer questions using Sheet 4 drawings.

a. What are the metal jamb dimensions for the 4" block wall?

____

b. What is the dimension of the masonry wall from the bottom of the entrance windows to the floor level? ______________

____

c. What is the distance from the finished floor to the finished ceiling? ______________________________

LEARNING PRACTICE (cont'd):

d. What kind of lintels are shown to carry the interior section of the walls above the windows in cross sections E-2-4 and G-2-4? ______________________________

____

Now that you have jumped over this hurdle, you're free to go to the next task package.

You showed yourself as true blue in your true blueprint reading!

UNIT XVII: READING BLUEPRINTS TO BUILD STRUCTURES ACCORDING TO PLANS AND SPECIFICATIONS

TASK PACKAGE 3: INTERPRETING BUILDING SPECIFICATIONS

PREREQUISITES: NONE

RATIONALE:

Let's be specific and rap about the in thing. Specifications are the written information, directions and explanations without which no blueprint is complete. The specifications are needed to clarify the information and directions in a blueprint, and to give such specific information and directions as cannot be placed on a blueprint but without which you could not construct the building as it was planned. Specifications are important not only for the information, but also they are a part of every contract. In the contract for the construction of a building, it is stipulated that all of the work and materials which the contractor supplies will meet the requirements that are stated in the specifications. The specifications, with the plans, are required when one applies for a building permit. So, with our permission, you may go on to the Objective, the Learning Activity, and then the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to orally discuss types of material and standards of brick laying that relate to the building specifications, using the Specifications For Clay Products on page 8 of Plan Reading For Brickmasons as the guide. Your performance will be evaluated in accordance to the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XVII-3, starring Tom Specific.
2. Read and study pages 8 through 11 in Plan Reading For Brickmasons. Observe the specifications directed toward materials and workmanship of the brickmason.
3. In the specifications you get information about:
    - a. who is responsible for erecting the building or parts of the building.
    - b. who must secure the various permits necessary.
    - c. who furnishes the needed insurance.
    - d. the responsibility of all parties who are a part of the building contract.
    - e. how and when payments are to be made to the contractor or contractors for completed work.

LEARNING ACTIVITY (cont'd):

f. quality of the materials to be used.

g. cost of the materials to be used.

h. standard of workmanship which must be maintained.

i. who judges the standard of the workmanship.

j. which parts of the work will be done by the contractor.

k. which parts of the work will be done by subcontractors.

l. which parts of the work will be done by the owner.

m. who will subcontract the work.

n. who must protect the property and adjoining property during construction.

o. who will clean up the property when construction has been completed.

p. guarantees and penalties.

q. changes made during construction.

4. Success comes to those who persevere, so, having completed the Learning Activity, go forth to the Learning Practice.

LEARNING PRACTICE:

1. Refer to the information found in Plan Reading For Brickmasons, pages 8 through 11, to be used in completing the following assignment. Record your answers in the spaces provided.

a. The following specification should be used on ________________ work for which the materials will be subject to laboratory ____________________________ before acceptance.

LEARNING PRACTICE (cont'd):

b. All brick shall be ____________________, whole, new clay or shale brick.

c. Loadbearing structural tile shall conform to the standard ____________________________ for Structural Clay Load-Bearing Wall Tile (ASTM C 34).

d. Mortar shall conform to the Standard Specifications for __________________________ for Unit Masonry (ASTM C 270).

e. All brick shall be laid ____________________ and true to lines.

f. Slashing of joints after _______________ should not be necessary.

g. All unreinforced masonry walls shall be structurally __________________ with either masonry __________________ or metal ties.

h. Exterior brickwork shall be wiped with a __________________ cloth as the work progresses and thoroughly _______________ on completion.

i. Protect masonry units, cementitious materials and ________ so that they are not wetted by rain, _____________________ or ground water.

j. All door and window frames ______________________ be set in mortar around their entire ______________________________.

k. Flashings shall be properly built into the ________________ as shown on the drawings.

LEARNING PRACTICE (cont'd):

1. Before acceptance, all masonry chimneys and ________________ built under this specification shall be subjected to a ________________ smoke test for tightness.

Build your dream, and interpret the specifications to make it come true.

UNIT XVII: READING BLUEPRINTS TO BUILD STRUCTURES ACCORDING TO PLANS AND SPECIFICATIONS

TASK PACKAGE 4: DESIGNING, SKETCHING AND BUILDING FIREPLACE

PREREQUISITES: UNIT I, TASK PACKAGE 5; UNIT VII, TASK PACKAGES 1-8; UNIT XVII, TASK PACKAGES 1 and 2

RATIONALE:

Are you ready to draw a bead on drawing some sketches? Masons should be quick on the draw, you know. Some drawing ability gives them better understanding of the preparation of building plans. And on occasion they are asked to design projects for customers.

Now that you have had considerable experience in working with building plans, you will have the opportunity to design and prepare a set of drawing sketches for a project which you will construct. Masons do not normally design and prepare working drawings, but this exercise will give you some valuable insight into the mechanics of preparing plans which you will constantly use in performing your work on the job site. This experience will be important to you when you are asked to design and construct a small masonry project for a future client. Continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to:

a. design and sketch a plan view (first course) and four elevation views of a simple outdoor fireplace.

b. build an outdoor fireplace that you designed in statement a using appropriate masonry standards.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package XVII-4, a fireside show.
2. Read page 73 in Bricklaying III. Observe the directions and suggestions to construct an outdoor fireplace.
3. Review task package 5 of Unit I, if necessary, to calculate the course spacing and height of your wall.
4. Review task packages 1 and 2 of Unit XVII, since these are the prerequisites for plan reading.
5. Use the skill gained from task packages 1-8, Unit VII, to build your design of an outdoor fireplace.
6. With the Learning Activity completed, proceed with the Learning Practice.

LEARNING PRACTICE:

1. Using the knowledge gained from previous task packages, you are now going to have the opportunity to be creative and design an outdooor fireplace.
2. Your design will be a sketch of a simple outdoor fireplace, similar to the one on page 74 of Bricklaying III. It will consist of the following:
   a. plan view (first course)
   b. front elevation view
   c. right side elevation view
   d. back elevation view
   e. left side elevation view
3. The fireplace is not to be over 42" in length, 38" in width and 28" in height.
4. Take your sketch to the instructor for his approval.
5. With the instructor's approval of your design and sketch, construct the outdoor fireplace in the masonry laboratory.
6. Secure the appropriate tools and equipment to construct the fireplace.
7. Dry bond the first course layout, using your sketch.
8. Mark layout on the floor.
9. Lay up first course bedding on mortar.
10. Use standard head joints 3/8" to 1/2".

LEARNING PRACTICE (cont'd):

11. All dimensions ± 1/8".

12. All courses plumbed ± 1/4" and leveled ± 1/4".

With the added skills and knowledge gained from this task package, why don't you build an outdoor fireplace for your family?

Brick masons helped build America.

18

RESEARCH PROJECT

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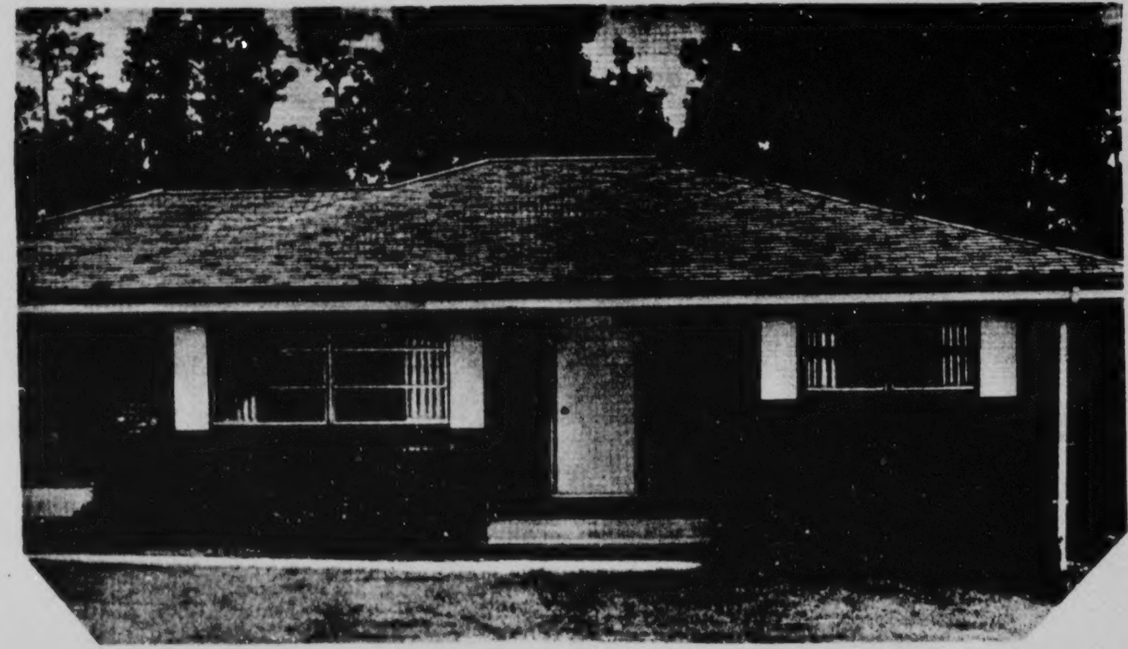

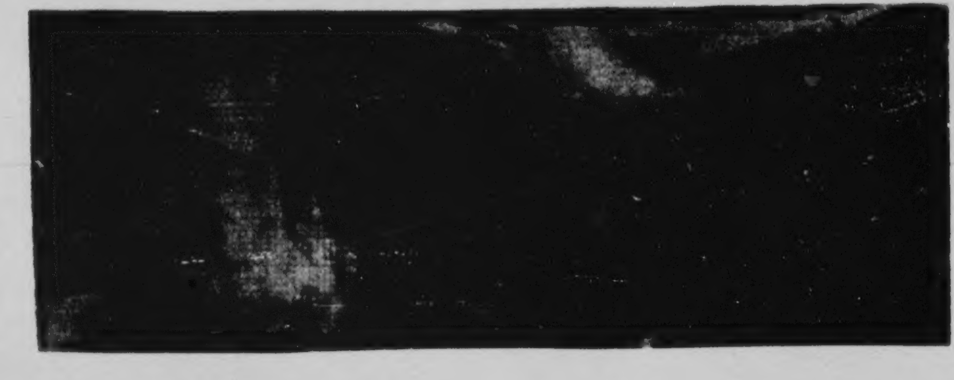

CLUSTER: MASONRY
COURSE: BRICKLAYING

CE 003932 (2)

UNIT XVIII: IDENTIFICATION OF TOOLS, EQUIPMENT, AND MATERIAL FOR CONCRETE MASONRY

PREREQUISITES: UNIT XVIII, TASK PACKAGES 2 and 3

RATIONALE:

With the construction industry at a very high level of employment, the youthful job-seeker does not have any difficulty in finding employment in the cement and concrete industy. This field offers an excellent opportunity for good earnings, advancement, and good working conditions; the resourceful mason may advance to the status of a concrete technician or an inspector.

Today's concrete worker is more advanced than his counterpart of 20 years ago. Yesterday's workman knew how to handle, mix and place concrete, but sometimes did not know why certain practices were good and others bad. This, you will have an opportunity to learn. You will learn how to make concrete a strong, long-lasting material that 30 years from now you'll be proud to say, "I did that job." This unit will make you acquainted with some of the tools, equipment and materials for concrete masonry.

Continue by reading the General Objective of the unit and the Specific Objectives for the task packages; read the Learning Activity, which will inform you of what you are to do.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to identify and describe tools, equipment and materials to mix and finish concrete.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Do the following:
   a. identify in writing the names of twelve commonly used hand tools for placing and finishing concrete.
   b. identify in writing the use of each of the twelve hand tools identified in statement a.

   Your performance will be evaluated in accordance with the instructor's checklist.

2. List in writing four types of concrete and state one characteristic of each type.

   Your performance will be evaluated in accordance with the instructor's checklist.

3. Correctly identify in writing five ingredients used in concrete mixture (and state the effect each ingredient has in a concrete mixture). Your performance will be evaluated in accordance with the instructor's checklist.

OBJECTIVE (cont'd):

4. Describe in writing the procedure used in mixing concrete by hand and mechanical methods.

   Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

The task packages in this unit should be completed in numerical order. Begin with task package number one and then two, three and four, in their numerical order. You will notice that only the last package has a Prerequisite: 2 and 3 of the same unit. In the task packages you will be asked to look at a sound-slide presentation, read assignments, answer questions and perform some practice exercises. The number and names of the task packages included in this unit are as follows:

TASK PACKAGE 1: CONCRETE HAND TOOLS.

TASK PACKAGE 2: CHARACTERISTICS AND TYPES OF CONCRETE.

TASK PACKAGE 3: CONCRETE INGREDIENTS.

TASK PACKAGE 4: MIXING CONCRETE.

Should you feel able to pass a comprehensive test over the tools, equipment, and material for concrete covered in this unit, check with your instructor. If not, begin your work as outlined above.

UNIT XVIII: IDENTIFICATION OF TOOLS, EQUIPMENT, AND MATERIAL FOR CONCRETE MASONRY

TASK PACKAGE 1: CONCRETE HAND TOOLS

PREREQUISITES: NONE

RATIONALE:

It would take considerable time to discuss every tool that is now available for concrete work. So we will limit this task package to the twelve most commonly used hand tools for placing and finishing concrete. You should keep abreast of the continuing development of new labor-saving tools through catalogs and masonry supply stores.

The tools we will be concerned with are the straight edge, hand tamper, darby, bull float, edger, jointer, wood float, magnesium float, steel trowel, power trowel, shovel, and rakes. Get to know these tools on a first name basis for you will have need for their service.

Now, continue by reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to do the following:

a. identify in writing the names of twelve commonly used hand tools for placing and finishing concrete.

b. identify in writing the use of each of the twelve hand tools mentioned in statement a.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package XVIII-1, starring Handy Toolkit.
2. Read pages 64 - 66 and 77 - 81 in Concrete Technology, by Delmar.
3. Study figures 36 through 48 on pages 77 through 81 in your textbook.
4. You have completed the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper list in writing twelve commonly used hand tools for placing and finishing concrete studied in

LEARNING PRACTICE (cont'd):

reading assignment on pages 77 through 81 in Concrete Technology.

2. Opposite each name of the hand tool of the preceding list, indicate the tool's principal use.
3. Have a classmate name a tool, and you respond by mentioning its use.
4. When you feel you are ready for an evaluation in terms of the Objective, go to the instructor.
5. When the instructor is satisfied with your performance in stating the names and uses of the hand tools, start the next task package.

Tool up your capabilities and become handy with success.

Remember man is a tool using animal.

BEST COPY AVAILABLE

UNIT XVIII: IDENTIFICATION OF TOOLS, EQUIPMENT AND MATERIAL FOR CONCRETE MASONRY

TASK PACKAGE 2: CHARACTERISTICS AND TYPES OF CONCRETE

PREREQUISITES: NONE

RATIONALE:

There are many varieties of concrete in terms of the quality and other characteristics of the ingredients used in a mixture. The most important types will be discussed in this task package. One of the types is the regular concrete, in which a standard mixture of materials is used. The second is a lightweight concrete mixture using other ingredients than regular concrete. The third is gunite which is used where extensive repair work is required to refinish a concrete wall, and the fourth type has additional reinforcement added to the regular concrete.

The general requirements of hardened concrete are strength and durability -- strength to perform the functions of the concrete and durability to resist exposure to the elements. Now, continue with reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to list in writing four types of concrete and state one characteristic of each type. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XVIII-2.
2. Read pages 66 and 67 of Masonry Simplified, Volume 1.
3. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper list in writing four types of concrete in the reading assignment on pages 66 and 67 in Masonry Simplified, Volume I.
2. Opposite the name of each type in the preceding list, indicate one characteristic of the type of concrete.
3. Cover up the list of names with your hand and, from the characteristics, recall the name of the type of concrete.
4. When you feel you are ready to be evaluated in terms of the Objective, go to the instructor.

LEARNING PRACTICE (cont'd):

5. If the instructor is satisfied with your performance in knowing four types of concrete and a characteristic of each, he will direct you to another package.

Success has concrete qualities.

UNIT XVIII: IDENTIFICATION OF TOOLS, EQUIPMENT AND MATERIAL FOR CONCRETE MASONRY

TASK PACKAGE 3: CONCRETE INGREDIENTS

PREREQUISITES: NONE

RATIONALE:

You know that all mixtures contain ingredients. This fact is true of concrete. It's a mixture, and here you study its ingredients.

Concrete is a mixture of sand, crushed rock or gravel, and cement. After these ingredients have been thoroughly mixed, the fourth ingredient is water, added in proper portions to give the concrete mixture the proper consistency. When concrete has been placed after mixing, it hardens into a dense mass of great strength. The fifth ingredient could be an admixture to add color, hasten or retard setting time, give the concrete more workability.

The selection of aggregates is of particular importance in making concrete. They should not contain materials having harmful effects, such as dirt, clay, coal, or other organic matters. The American Society of Testing of Materials classifies the type of portland cement to be used for specified job conditions. Water is added to the mixture of portland cement, coarse and fine aggregates.

RATIONALE (cont'd):

Admixtures should always be used following the directions furnished by the manufacturer. Now continue with the Objective, do the Learning Activity and complete the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to correctly identify in writing five ingredients used in a concrete mixture and state the effect each ingredient has in a concrete mixture. Your performance will be evaluated in accordance with your instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XVII-3, featuring Mixie Mix.
2. Read pages 73 through 85 of Masonry Simplified, Volume I.
3. Observe figure 10, page 78, and figure 12, page 82.
4. This completes the Learning Activity; now begin the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper identify in writing by listing five ingredients used in a concrete mixture you studied in the reading assignment on pages 73 through 85 of Masonry Simplified, Volume I.

LEARNING PRACTICE (cont'd):

2. Opposite each ingredient of the preceding list, indicate the effect it has in a concrete mixture.
3. Have a classmate give you the name of an ingredient or the effect an ingredient has in a concrete mixture, and you respond with the opposite meaning.
4. Go to the instructor when you feel you are ready to be evaluated in terms of the Objective.
5. The instructor will recommend another task package for you when he is satisfied with your performance.

With the skills you are achieving, you will not be a coarse mason but a fine one.

Success is a mixture of ingredients - tools, equipment, materials, know-how, planning, and hard work.

UNIT XVIII: IDENTIFICATION OF TOOLS, EQUIPMENT AND MATERIAL FOR CONCRETE MASONRY

TASK PACKAGE 4: MIXING CONCRETE

PREREQUISITES: UNIT XVIII, TASK PACKAGES 2 AND 3

RATIONALE:

Concrete is one of the most interesting of all structural materials as well as the most useful, because it is strong, durable, sanitary, economical and fire resistant. The upkeep cost of concrete is low, and many ways of finishing the concrete make it attractive in appearance. Because it is plastic when first mixed, concrete can be placed into any type of form that is desirable.

Perhaps no other structural material is dependent on so much for its success than the people who mix and place it. Selection of quality ingredients, accurate proportioning, careful mixing, and proper placing are essential to good concreting. Unlike the mixing of mortar, in which you use the greater amount of water, the concrete mixture uses the least amount of water to make it a plastic mass. The less water used in a batch of concrete, the greater the strength is of that concrete. In this task package you will learn how to mix concrete by hand and by mechanical means. Continue with reading the Objective and doing the Learning Activity and Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to describe in writing the procedure used in mixing concrete by hand and mechanical methods. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package XVIII-4, held over for another week.
2. Read pages 91 through 94 of Masonry Simplified, Volume I. Observe figures 16, 17, 18, 19 and 20 within these pages.
3. Read page 75 of Concrete Technology.
4. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper describe in writing the procedure used in mixing concrete by hand which you studied on pages 91 - 94 of Masonry Simplified, Volume I.
2. On a sheet of paper describe in writing the procedures used in mixing concrete by mechanical methods found on pages 75 and 76 of Concrete Technology.
3. Discuss with a classmate the advantages or disadvantages of using the first method in step 1 over the second method in step 2.

LEARNING PRACTICE (cont'd):

4. Go to the instructor when you feel you are prepared to be evaluated in terms of the Objective.

5. The instructor will give you another task package when he is satisfied with your performance on this task package.

Mix and match for your next task package.

Mix work with play and you will succeed.

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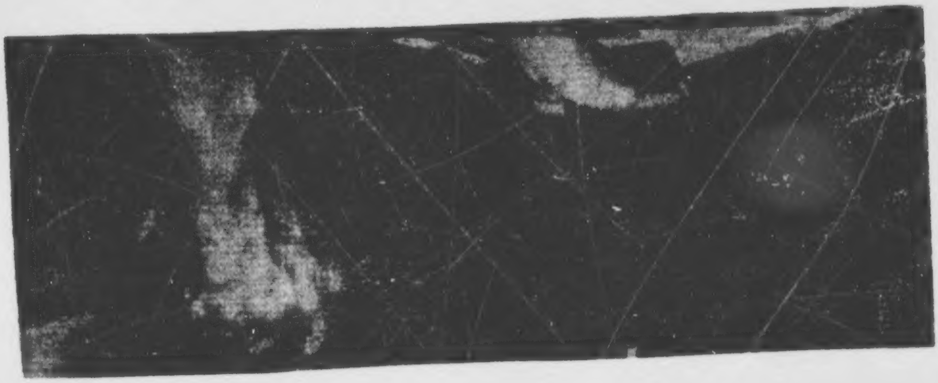

CLUSTER: MASONRY
COURSE: BRICKLAYING

CE003732 (A)

UNIT XIX: METHODS FOR TROWELING SMOOTH FINISHES AND TEXTURES ON CONCRETE SURFACES

PREREQUISITES: NONE

RATIONALE:

This task package deals with the final finishes on the surface of concrete that give the desired appearance and texture. The proper time for troweling or finishing the concrete is important. Where a smooth dense surface is desired, floating must be followed by steel troweling it some time after the moisture film or sheen disappears from the floated surface, and when the concrete has hardened enough to prevent fine material and water from being worked to the surface. Delay this step as long as possible for excessive troweling tends to produce crazing and lack of durability. Steel troweling should leave the surface free of marks and ripples. The wood float finish, brooming and exposed gravel operations are similar, except for the final finish.

Now, read the General Objective of this unit and the Specific Objectives of the individual packages. The Learning Activity of the unit will tell you what to do and the procedure in carrying out the task.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to apply a final finish on the surface of concrete.

SPECIFIC:

Upon completion of the task packages for this unit, you will be able to:

1. Achieve a smooth finish on a concrete surface, using a steel trowel. Your performance will be evaluated in accordance with the instructor's checklist.
2. Achieve a texture finish on a concrete surface by using a wood float or broom. Your performance will be evaluated in accordance with the instructor's checklist.
3. Achieve a texture finish on a concrete surface by exposing gravel. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

To complete this unit you could work the task packages in any order since there is no Prerequisite for the unit. The unit has three task packages, and each is individual without depending on the other. In the packages you will discover a sound-slide presentation to be viewed, reading assignments and directions to follow in applying

LEARNING ACTIVITY (cont'd):

the specific concrete finish. The unit contains the following task packages:

TASK PACKAGE 1: TROWELING A SMOOTH FINISH

TASK PACKAGE 2: A WOOD FLOAT OR BROOM FINISH

TASK PACKAGE 3: EXPOSING GRAVEL CONCRETE SURFACE

Upon successful completion of the Learning Activity and Learning Practice in the packages of this unit, if you should feel confident enough to pass a comprehensive test at this time, contact your instructor. However, should you feel you are not ready to be tested, begin your work as outlined above.

UNIT XIX: METHODS FOR TROWLLING SMOOTH FINISHES AND TEXTURES ON CONCRETE SURFACES

TASK PACKAGE 1: TROWELING A SMOOTH FINISH

PREREQUISITES: NONE

RATIONALE:

If you're an old smoothie, you'll enjoy this package. It gives you a chance to accomplish some smooth work. So trowel on into the package.

In troweling a smooth finish on a concrete surface with a steel trowel, the proper time for final troweling is important. The concrete is allowed to stand until it is quite stiff but still workable; the steel trowel will compact the concrete or topping to produce a dense surface without drawing the cement and fine ingredients to the surface. Too much steel troweling causes hair cracking and also a dusting condition after the concrete is hardened.

The steel trowel finish should only be applied on interior or exterior protected areas. Another practice that is not recommended is dusting the wet concrete with portland cement to dry up the concrete to get the final finish. This completes the Rationale. Read the Objective, do the Learning Activity and complete the Learning Practice.

BM-XIX-1

OBJECTIVE:

Upon completion of this task package you will be able to achieve a smooth finish on a concrete surface using a steel trowel. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XIX-1, starring Smoothie Trowel.
2. Read page 89 in Concrete Technology, section Troweling.
3. View figures 47, 48 and read the accompanying material for Hand and Power Trowels in Concrete Technology.
4. Observe the illustration on the bottom of page 344 in figure 26, Masonry Simplified, Volume I.
5. Steel forms 2' x 2' x 2" to be made in the metal shop for use in the masonry shop.
6. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Steel trowel.
2. Wooden float
3. 2' x 2' x 2" steel forms
4. Concrete
5. 8 reinforcing wire 6" x 6"

LEARNING PRACTICE (Cont'd)

1. In the 2' x 2' x 2" steel form place the concrete to be finished, using a steel trowel to [illegible] the concrete surface.
2. Allow the top surface to harden (set) until it becomes quite stiff (see your instructor to aid you in determining this until you reach the degree of skill that will enable you to determine it yourself); then finish the surface with a wood float as smoothly as possible.
3. You cannot rush the setting time of concrete, so be patient until the surface is ready for finish. One way to aid is with the use of an admixture to the mixture.
4. The next operation is to use the steel trowel for the final finish; if, when you finish with the steel trowel, there are trowel marks left on the surface, wait a short while longer and retrowel.
5. Do not use excessive troweling, for this produces surfaces which, after hardening, tend to crack.
6. Clean all your tools before the concrete hardens and place a little oil on them to keep them from rusting.
7. Get your instructor to evaluate the steel trowel finish according to his checklist.

You're learning to trowel your way smoothly to prosperity and happiness.

UNIT XIX: METHODS FOR TROWELING SMOOTH FINISHES AND TEXTURES ON CONCRETE SURFACES.

TASK PACKAGE 2: A WOOD FLOAT OR BROOM FINISH

PREREQUISITES: NONE

RATIONALE:

A wood float here is not a raft with which to tour the Mississippi River. And the broom is not a witch's broom with which to ride the sky. Learn about these terms as they apply to masonry.

Need a little traction? Try a wood float or broom finish on a concrete surface. This is what this task package is all about - being able to achieve a texture finish on a concrete surface using a wood float or a broom. For gritty, non-slippery concrete surfaces, this finish can be done entirely with the wood float, or the wood float and final finish with the broom.

Sidewalks, driveways, patios or other concrete surfaces should be textured when they are in unprotected areas. Another type of texturing used in these circumstances will be detailed in the next task package. Smooth surfaces in these areas are dangerous, especially during and immediately after a rainstorm. Continue now with the Objective, do the Learning Activity, and complete the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to achieve a texture finish on a concrete surface by using a wood float or broom.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XIX-2, featuring Broomy Float.
2. Read page 88 in Concrete Technology.
3. Observe figure 26, page 344, Masonry Simplified, Volume I, the illustration at the top of the page; also figure 30, page 349, in the same textbook.
4. There are not any illustrations of a mason using the broom finish, so have your instructor demonstrate.
5. This completes the Learning Activity; now go on with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Wood float	5. Concrete
2. Broom	6. # 8 reinforcing wire 6" x 6"
3. 2' x 2' x 2" steel forms	

1. Place the concrete in the 2' x 2' x 2" steel form to be finished, using a wood float or broom to achieve the texture on the concrete surface.
2. Follow the directions in the reading assignment on page 88, Concrete Technology, to the completion of the concrete surface for the wood float finish. Observe the illustration on page 349 in Masonry Simplified, Volume 1.
3. If you desire to apply the broom finish, the same steps apply in the preparation of the concrete to the setting so as to make the final texture on the surface. Have your instructor demonstrate how this is achieved. As you become skilled in using the broom, try some artistic patterns by moving the broom in different directions. They will give you a pleasing result.
4. When you have finished your texture of the concrete surface, have the instructor evaluate it; and if he is satisfied with your performance in accordance with the Objective, reach out for another task package.

UNIT XIX: METHODS FOR TROWELING SMOOTH FINISHES AND TEXTURES ON CONCRETE SURFACES

TASK PACKAGE 3: EXPOSING GRAVEL CONCRETE SURFACE

PREREQUISITES: NONE

RATIONALE:

Just as the clothing industry has its latest fashions, the exposed gravel concrete surface is the latest thing in the texture finish of concrete projects.

The exposed gravel surface is becoming the most popular finish on concrete patios, sidewalks and concrete surfaces around the popular shopping centers. As with any new fashion, the cost of installing concrete with the exposed gravel texture is higher per square foot than other types of texture or smooth finishes. Now that you are exposed to this type of concrete surface, expose yourself to the Learning Activity and do the Learning Practice after reading the Objective.

OBJECTIVE:

Upon completion of this task package you will be able to achieve a texture finish on a concrete surface by exposing gravel. Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XIX-3, starring Gravel Gertie.
2. Read Patterned and Textured Finishes, pages 89 and 90 in Concrete Technology.
3. There is very little reading material, so follow the directions in the Learning Practice to achieve an exposed gravel concrete surface.
4. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Wood or magnesium float
2. 2' x 2' x 2" steel forms
3. Concrete
4. 8 reinforcing wire 6" x 6"
5. Retarder
6. Compressor sprayer

LEARNING PRACTICE (cont'd):

1. In the 2' x 2' x 2" steel forms, place the concrete to be finished to achieve an exposed gravel finish on the surface. Concrete should be stiff and not too wet.
2. Straight edge the concrete to the top of the forms and allow the concrete to set approximately 20 minutes.
3. You may use the descriptions in the reading assignment on pages 89 and 90 in Concrete Technology to achieve the exposed gravel surface on the concrete, and study the following directions not covered in the reading.
4. Using the compressor sprayer containing a chemical retarder, observe the direction on the retarder container and avoid any danger working with a chemical, making two quick passes over the entire surface of the slab.
5. The next day (24 hours later) you can remove the fine material from the surface, using a stiff brush or broom and a little water. If there are a few stubborn areas, use a steel wire brush, but be careful not to rub too hard.
6. Check with your instructor and have him evaluate the exposed gravel surface, and you have hit a milestone in the learning of a comparatively new development in concrete finishing.

Expose your talents to success.

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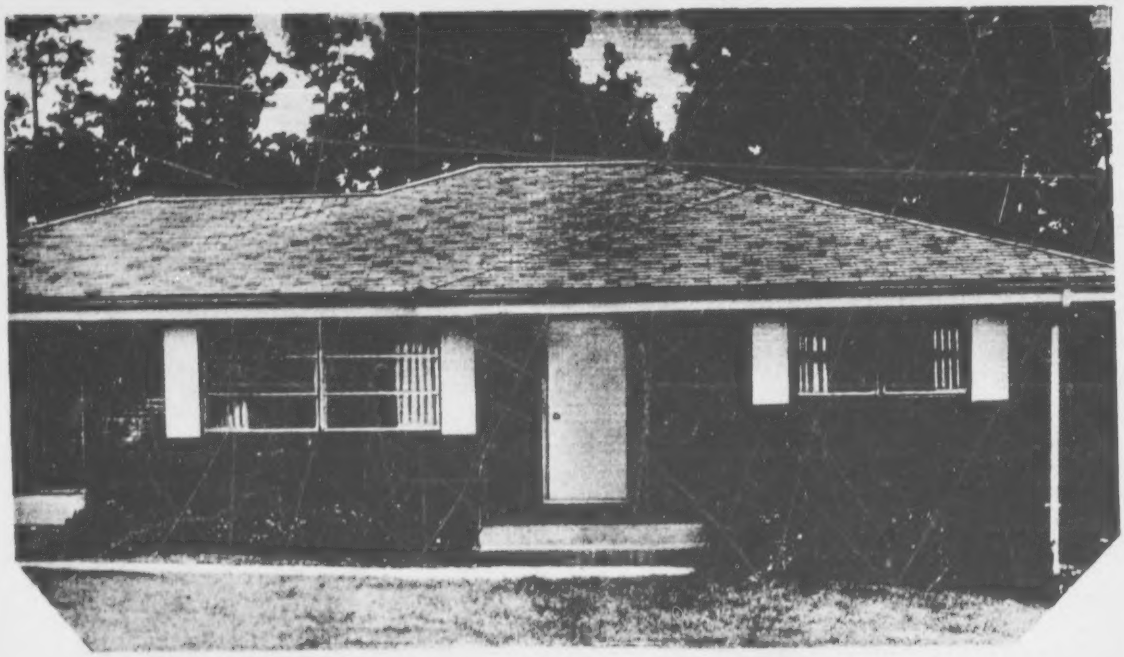

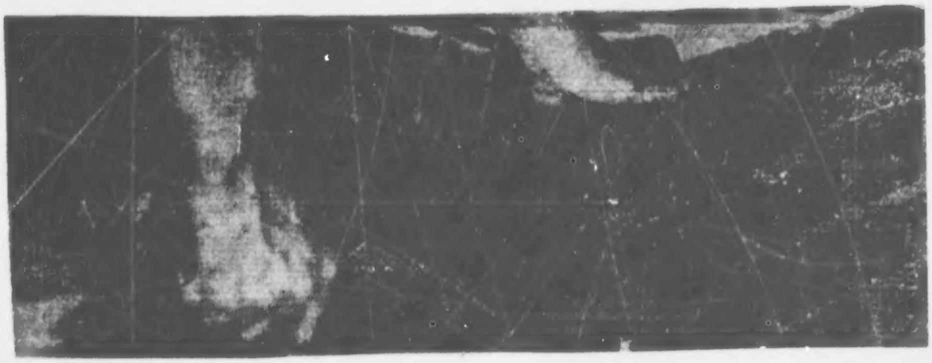

CLUSTER: MASONRY
COURSE: BRICKLAYING

CE063932

UNIT XX: PREPARATION AND USE OF CONCRETE MASONRY

PREREQUISITES: UNIT XIX, TASK PACKAGES 1 and 2; UNIT XX,
TASK PACKAGES 1-4

RATIONALE:

In order for concrete footings, concrete sidewalks, concrete driveways, concrete floors, concrete steps and porch slabs to be poured, there must be a means of containing the wet plastic material in its desired design, until it is hardened. This is done through the formwork that is constructed of earth, lumber or metal. Forms for concrete must be tight, rigid and strong. They must be braced enough to keep their true alignment and strong enough to hold the wet mass of concrete. In the placing of concrete in the forms, good compacting techniques produce a tight bond between the concrete ingredients and assure complete filling of the forms. This eliminates the honey combs in concrete work. Placing of concrete should be carried on continuously to avoid cracking at the joining areas. Removing of forms in most cases is completed after a few days of the concrete's setting up. When removing forms the same day as the pour, extreme care must be exercised in the form removal.

Now read the General Objective of this unit and the Specific Objectives of the individual task packages; then do the Learning Activity, which will indicate to you what you are to do and how to proceed in the completion of this unit.

OBJECTIVE:

GENERAL:

Upon completion of this unit package you will be able to construct forms, place concrete and remove forms for a variety of concrete projects.

SPECIFIC:

Upon completion of the work packages for this unit, you will be able to:

1. Do the following:
   a. list two types of materials that are used in concrete formwork.
   b. describe in writing five requirements of formwork.

   Your performance will be evaluated in accordance with the instructor's checklist.
2. Construct a concrete footing for a residence doing the following:
   a. construct concrete footing forms.
   b. place concrete in the forms.
   c. remove forms from the footings.

   Your performance will be evaluated in accordance with the instructor's checklist.
3. Construct a concrete sidewalk, doing the following:
   a. construct concrete forms.
   b. place concrete in the forms.
   c. remove forms from the sidewalk.

OBJECTIVE (cont'd):

Your performance will be evaluated in accordance with the instructor's checklist.

4. Construct a concrete driveway, doing the following:

   a. construct concrete forms.

   b. place concrete in the forms.

   c. remove forms from the driveway.

   Your performance will be evaluated in accordance with the instructor's checklist.

5. Construct a concrete floor for a garage, doing the following:

   a. construct concrete forms.

   b. place concrete in the forms.

   c. remove forms from the floor.

   Your performance will be evaluated in accordance with the instructor's checklist.

6. Construct concrete steps and porch slab, doing the following:

   a. construct concrete steps and porch slab forms.

   b. place concrete.

   c. remove forms from the steps and porch slab.

   Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

In order to complete this unit successfully, you must complete the task packages in numerical order, beginning with task package number one. Each one of the packages is a stepping stone (concrete) to another one. In the packages you will view a sound-slide program, read assignments, answer questions and construct forms; place concrete in footings, sidewalks, driveways, garage floors, porch slabs and steps; also remove forms from hardened concrete. The titles of the packages contained in the unit are:

TASK PACKAGE 1: MATERIALS AND REQUIREMENTS FOR FORMWORK.

TASK PACKAGE 2: CONSTRUCTING A CONCRETE FOOTING.

TASK PACKAGE 3: CONSTRUCTING A CONCRETE SIDEWALK.

TASK PACKAGE 4: CONSTRUCTING A CONCRETE DRIVEWAY.

TASK PACKAGE 5: CONSTRUCTING A CONCRETE GARAGE FLOOR.

TASK PACKAGE 6: CONSTRUCTING CONCRETE PORCH SLAB AND STEPS.

Begin work on the individual task packages and, upon completion of all packages, check with the instructor for the unit evaluation.

UNIT [illegible]: PREPARATION AND USE OF CONCRETE MASONRY

TASK PACKAGE 1: MATERIALS AND REQUIREMENTS FOR FORMWORK

PREREQUISITES: NONE

RATIONALE:

Everything has form -- the universe, the world, art, and industry. So get acquainted with masonry formwork at this point. Form is creative, and creative activities are enjoyable.

The finished concrete product is only as good as the form in which it was cast; so it is every bit as important and as essential as the concrete for which the formwork was built. The adaptability and versatility of concrete is a known fact, and it is used in all kinds of structures. One fact seldom given due consideration is that the very nature of the concrete which makes it of such great value in construction work is dependent solely on the formwork. It is not unusual for the formwork cost to exceed that of the concrete. Structurally, formwork is important because of the great density or weight of the concrete it must contain until the concrete mass becomes hardened (set). A cubic foot of concrete (regular) will weigh approximately 150 pounds, as perhaps this makes it understandable why it is necessary for the formwork to be well built and braced. You will learn of the materials of formwork and requirements of formwork. Now continue with the Objectives, do the

DIRECTIONS (cont'd):

Learning Activity and complete the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to do the following:

1. List two types of materials that are used in concrete formwork.
2. Describe in writing [illegible] requirements of formwork.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XX-1, a show with form.
2. Read and study pages 3 through 7 and 36 through 41 in Masonry Simplified, Volume II.
3. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

1. On a sheet of paper list in writing two types of materials used in concrete formwork as discussed in the reading assignment, pages 7 through 41 of Masonry Simplified, Volume II.

[illegible] (continued):

2. [illegible] step 1 describe in writing five requirements of formwork based on the reading assignment, pages 3 through 6, in Masonry Simplified, Volume II.

3. Discuss with a classmate the advantages or disadvantages of the formwork material in relation to the requirements of the formwork.

4. When you feel you are ready, take your responses to the [illegible] in terms of the Objective. When the instructor is satisfied with your performance in knowing the materials and requirements of formwork, go on to another task package.

6. Clean all concrete tools immediately after using them; the hardened concrete is difficult to remove and a clean tool can be used with greater advantage.

Structure your formwork to the requirements of success.

UNIT XX: PREPARATION AND USE OF CONCRETE MASONRY

TASK PACKAGE 2: CONSTRUCTING A CONCRETE FOOTING

PREREQUISITES: UNIT XX, TASK PACKAGE 1

RATIONALE:

You don't have to go to the foot of the class to study footing. In fact, you may be at the head of the class and study footing - concrete footing, that is. Learn about it here.

In this task package you will obtain the knowledge of constructing footing forms, placing concrete in the footing form, and removing the forms from the concrete after the concrete has set the required length of time.

The footings are the stabilizing members of the structure to be built. They need to be deep enough, below the frost line, and on firm soil to be of a great value. There are very few structures built that do not require a footing under the wall. The most economical of footings is the concrete footing. As stated in task package 1 of this unit, the footing formwork should be structurally well built, and also the aligning of the footer forms is very important; care should be exercised in placing concrete into the forms; do not bump the forms if using a wheelbarrow to transport the concrete to the forms. In order to know how much concrete will be needed for the footing and the concrete jobs which are to follow, there are two principal methods used for calculating the amount of concrete needed.

RATIONALE (cont'd):

First, the concrete calculator is available for use and, secondly, there is the mathematical method for figuring the amount. Now, read the Objective and do the Learning Activity and the Learning Practice.

OBJECTIVE:

[illegible] completion of this learning package you will be able to construct a concrete footing for a residence, doing the following:

a. construct concrete footing forms.
b. place concrete in the forms.
c. remove forms from the footings.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XX-2, featuring Footsy Foote.
2. Read Footing Formwork, pages 8 through 13 in Masonry Simplified, Volume II, for the construction of footing forms.
3. Read pages 94 to 96 in Masonry Simplified, Volume I, for placing concrete in the forms.
4. Read pages 49 and 50 in Masonry Simplified, Volume II, for form removal.

LEARNING ACTIVITY (cont'd):

5. The formula used for calculating concrete is:

$$\frac{L' \times W' \times D'}{27 \text{ cubic feet}} = \text{number of cubic yards}$$

L = length in feet; W = width in feet; D = depth in feet.

Concrete is calculated in cubic yards.

6. This completes the Learning Activity; proceed to the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Form lumber materials
2. Hammer and nails
3. Sledge hammer
4. Folding rule and 100' tape
5. Shovels
6. Wooden float
7. Builder's transit
8. Tripod rod and target
9. Hatchet
10. Mason's line
11. Concrete
12. Wrecking bar
13. Wheelbarrows
14. Short straight edge

1. Construct concrete footing forms using the reading assignment on pages 94 to 96 in Masonry Simplified, Volume II, as the procedure.
2. Oil or wet with water the inside of the forms just before placing the concrete.
3. Place concrete in the footing forms as directed in the reading assignment on pages 49 and 50 in Masonry Simplified, Volume I.

LEARNING PRACTICE (cont'd):

4. When the concrete is filled to the elevation required in the footing forms, strike off the top of the concrete for a uniform and level surface, using the wooden float.
5. Remove forms from the concrete footing as directed on pages 49 and 50 in *Masonry Simplified*, Volume II.
6. Have the instructor evaluate each operation according to his checklist.

Foot your way to success with well-constructed concrete footing.

UNIT XX: PREPARATION AND USE OF CONCRETE MASONRY

TASK PACKAGE 3: CONSTRUCTING A CONCRETE SIDEWALK

PREREQUISITES: UNIT XX, TASK PACKAGES 1 AND 2

RATIONALE:

East Side, West Side - all around the town. You've heard of the sidewalks of New York, haven't you? Well, they had to be constructed in forms, as indicated in this package.

For the many thousands of feet of sidewalks in your city already in use, the form builders had to construct forms to contain the thousands of cubic yards of concrete that they consist of and then remove the forms after the concrete hardened. These are the processes involved in the constructing of a concrete sidewalk. The width and depth of most city sidewalks are 4 to 5 feet wide and the thickness of a 2 by 4; but, as with other structures, the local building codes are the standards by which sidewalks are to be built. The skills obtained in constructing sidewalks will be stepping-stones to building a larger slab, such as a driveway or a floor. Now, continue with the Objective and Learning Activity and complete the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to construct a concrete sidewalk doing the following:

a. construct concrete forms.

b. place concrete in the forms.

c. remove forms from the sidewalk.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XX-4, starring Side Walky.
2. Read pages 339 through 343 in Masonry Simplified, Volume I, the section Building Masonry Sidewalks.
3. Read pages 49 and 50 in Masonry Simplified, Volume II, for removing formwork.
4. Calculate the amount of concrete using the information of task package 2, Unit XX.
5. This completes the Learning Activity; proceed with the Learning Practice.

[illegible] PRACTICE:

Tools and Equipment

1. Form lumber materials
2. Hammer and nails
3. Sledge hammer
4. Folding rule and 100' tape
5. Shovels
6. Straight edge
7. Wooden float or broom
8. Builder's transit
9. Tripod, rod and target
10. hatchet
11. Mason's line
12. Concrete
13. Wrecking bar
14. Wheelbarrow
15. Expansion joint material
16. Cinders or gravel

1. Construct sidewalk forms described in the reading assignment pages 339 to and including the first paragraph on page 342, of Masonry Simplified, Volume I.
2. Place the concrete in the sidewalk forms after wetting or oiling the forms according to the specifications in the reading assignment on pages 342 and 543 in Masonry Simplified, Volume I.
3. The surface of the concrete sidewalk may be finished as described using the wooden float, or a broom finish may be applied giving a different texture.
4. Remove the forms from the concrete sidewalk as described on pages 49 and 50 in Masonry Simplified, Volume II.
5. Have the instructor evaluate each operation according to his checklist. Get another task package to keep your enthusiasm up.

UNIT XX: PREPARATION AND USE OF CONCRETE MASONRY

TASK PACKAGE 4: CONSTRUCTING A CONCRETE DRIVEWAY

PREREQUISITES: UNIT XX, TASK PACKAGES 1-3

RATIONALE:

You are going to learn about a driveway; not a city street, roadway or drag strip, but a driveway at a residence or other small building off the main street. The driveway will be built in a similar manner to the sidewalk construction in the previous task package, except the forms will be spaced wider apart, which will necessitate your working on top of the concrete as illustrated on page 49, figure 30 in Masonry Simplified, Volume I. Also, you will place expansion joints where necessary as explained in the reading assignment. You are to construct formwork, place the concrete and remove the forms from the concrete after the hardening time is up. It is now time to read the Objective, do the Learning Activity and complete the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to construct a concrete driveway doing the following:

a. construct concrete forms.

b. place concrete in the forms

c. remove forms from the driveway.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XX-4, featuring Drivey Way.
2. Read pages 329, 330 and 346 in Masonry Simplified, Volume I.
3. Review if necessary pages 339 through the first paragraph on 342 for the setting of the driveway forms.
4. Read pages 49 and 50, in Masonry Simplified, Volume II, for form removal.
5. Calculate concrete as recorded in task package 2, Unit XX.
6. This completes the Learning Activity; now do the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Form lumber material
2. Hammer and nails
3. Sledge hammer
4. Folding rule and 100' tape
5. Shovels
6. Straight edge

LEARNING PRACTICE (cont'd):

7. Wooden float or broom
8. Builder's transit
9. Tripod rod and target
10. Hatchet
11. Mason's line
12. Concrete
13. Wrecking bar
14. Wheelbarrow
15. Expansion joint material
16. Cinders or gravel

1. Construct driveway forms described in the reading assignment, pages 329, 330, and 346 of Masonry Simplified, Volume I, and if necessary the procedures described for concrete sidewalks in task package 3, Unit 4.
2. Place the concrete in the driveway forms after wetting or oiling forms according to the specifications in the reading assignment on pages 342, 343 and 346 in Masonry Simplified, Volume I.
3. As with the surface of the concrete sidewalk, the concrete driveway surface may be a broom texture rather than either the wooden float or steel trowel finish.
4. Remove the forms from the concrete driveway as described on pages 49 and 50 in Masonry Simplified, Volume II.
5. Have the instructor evaluate each step according to his checklist.

Drive your way to success.

UNIT XX: PREPARATION AND USE OF CONCRETE GARAGE FLOOR

TASK PACKAGE 5: CONSTRUCTING A CONCRETE GARAGE FLOOR

PREREQUISITES: UNIT XX, TASK PACKAGES 1-4

RATIONALE:

Don't let your attention drain away and stay off those ski slopes for a while. Let this package trap your attention and focus it on the slope and drainage for a garage floor.

The construction of the footing, the sidewalk, and the driveway were somewhat similar, but each required different skills not employed in the other. In constructing the garage concrete floor, you will be working within closed walls and your forms are constructed somewhat differently from the others. The forms, as the directions indicate in the reading assignment, are set to give a slope for drainage purposes to the trap. The forms must be removed after an early set and the spaces filled in with concrete before final finish is applied to the floor. Place the concrete in forms as directed in order to level the concrete, using your straight edge. Continue by reading the Objective and doing the Learning Activity and the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to construct a concrete floor for a garage, doing the following:

a. construct forms.
b. place concrete in the forms.
c. remove forms from the floor.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XX-5, starring Gary Garage Floor.
2. Read pages 347 through 349 in Masonry Simplified, Volume I. Observe figure 22, page 338.
3. Calculate the amount of concrete needed for the garage floor from the information in task package 2, Unit XX.
4. This completes the Learning Activity; proceed with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Form lumber materials
2. Hammer and nails
3. Sledge hammer
4. Folding rule and 100' tape
5. Builder's transit
6. Tripod, rod and target
7. Shovel
8. Rake or hoe
9. Straight edge.
10. Wooden float or broom
11. Steel trowel
12. Wheelbarrow
13. Wrecking bar
14. Mason's line
15. Cinders or gravel
16. Expansion joint material
17. Concrete

1. Construct the concrete garage floor forms described in the reading assignment, page 347, and the first paragraph of page 348, in Masonry Simplified, Volume I, referring to figure 22, page 338.
2. Place the concrete in the garage floor forms, using the techniques described on pages 348 and 349 in Masonry Simplified, Volume I.
3. Follow the directions on removing the forms and filling in the spaces left with concrete.
4. As with the other concrete jobs, the concrete floor surface can be finished with the steel trowel, wooden float, or broom texture.

LEARNING PRACTICE (cont'd):

5. Have the instructor evaluate each operation in accordance with his checklist.

If you can pour successful garage floors, you'll be able to drive a sleek buggy into your own garage.

UNIT XX: PREPARATION AND USE OF CONCRETE MASONRY

TASK PACKAGE 6: CONSTRUCTING CONCRETE PORCH SLAB AND STEPS

PREREQUISITES: UNIT XX, TASK PACKAGES 1 AND 2

RATIONALE:

If you tread onward to new skills, you'll be an early riser in the masonry world. Concentrate now on this package dealing with the porch slab and steps.

One of the most important features of masonry steps is the treads (the section one steps on) and the riser (the vertical distance from tread to tread). These must be planned to provide comfortable use and safety. The height of the riser is determined by the distance from the top of the sidewalk to the doorstep, and risers should be of equal heights between 6 and 8 inches. The lower the riser, the wider the tread needs to be. A desirable formula to use for steps is twice the height of the riser, plus the width of the tread, equals 25. The porch slab is constructed in the same manner as a sidewalk; and when built in the same operation with the steps, concrete should be placed in the steps at the same time. This is known as a monolithic pour. Steps and porch slabs, if not firmly supported by the soil, should be strengthened by the use of steel-reinforced bars properly located. Continue with reading the Objective, doing the Learning Activity and completing the Learning Practice.

OBJECTIVE:

Upon completion of this task package you will be able to construct the concrete step, and porch slab doing the following:

a. construct concrete step and porch slab forms.

b. place concrete.

c. remove form from the steps and porch slab.

Your performance will be evaluated in accordance with the instructor's checklist.

LEARNING ACTIVITY:

1. View sound-slide package BM-XX-6, featuring Slabby Porch.
2. Read pages 352 through 354 in Masonry Simplified, Volume I, the sections Steps and Entrance Platforms.
3. Observe figure 19, page 335, in Masonry Simplified, Volume I.
4. Calculate quantity of concrete for steps and porch slab, using information in task package 2, Unit XX.
5. This completes the Learning Activity; carry on with the Learning Practice.

LEARNING PRACTICE:

Tools and Equipment

1. Form lumber materials
2. Hammer and nails
3. Sledge hammer
4. Folding rule and 100' tape
5. Mason's long level
6. Shovel
7. Rake or hoe
8. Straight edge
9. Wooden float
10. Steel trowel
11. Broom
12. Wheelbarrow
13. Wrecking bar
14. Mason's line
15. Concrete
16. Reinforcing rods

1. Construct the concrete porch slab and steps forms illustrated in figure 19, page 335, and the reading assignment, pages 352 through 354, in Masonry Simplified, Volume I.
2. Wet or oil the porch and step forms.
3. Place the concrete into the forms in the same manner as you did in construction of the footing, sidewalk, driveway, garage floor, or follow the directions on page 353 in Masonry Simplified, Volume I.
4. It is possible to remove the form from the porch and steps after the concrete is set the same day and the concrete voids filled in and finished off; but perhaps you had better follow the directions on page 354 in Masonry Simplified, Volume I, the section Form Removal.

LEARNING PRACTICE (cont'd):

5. Have the instructor evaluate each operation according to his checklist.

Tread by tread, you're climbing the steps to success.